MITEL NETWORKS

3100 Integrated Communications Platform

TECHNICIAN'S HANDBOOK

Release 4.1

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Mitel Networks 3100 Integrated Communications Platform
Technician's Handbook

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Chapter 1
Introduction

About this handbook

Purpose of this handbook

This handbook provides

- an overview of the system capabilities
- installation steps
- programming procedures
- maintenance checklists
- troubleshooting information.

Who this handbook is written for

This handbook is for a qualified technician who has successfully completed the 3100 ICP system technical training.

Where you can find more information

Technical documentation

On the system software CD-ROM

1. Insert the system software CD-ROM in the CD-ROM drive of your PC.
2. If the CD-ROM does not start automatically, open Windows® Explorer and navigate to the CD-ROM directory. Click **Autorun.exe**.
3. In the Welcome screen, click **Documentation** at the top of the list.

From the tools

1. After initial installation, launch your browser and go to the following URL: **http://192.168.1.2**
2. Click **Help**.

From the internet

1. Go to the following URL: **http://www.mitel.com**
2. Access Mitel OnLine from the Partners and Resellers selection menu.
3. Click **Technical** and then click **Product Documentation**.

User Guides through Manual Maker

Manual Maker is a web-based application that allows you to generate customized user guides

1. Go to the following URL: **http://www.mitel.com**
2. Access Mitel OnLine from the Partners and Resellers selection menu.
3. Click **Tools** and then click **Manual Maker Tool.**

You can also launch Manual Maker from the group administration tool.

Field change instructions

Every software release is accompanied by a Field Change Instruction (FCI). The FCI describes software changes, bug fixes, outstanding issues, and hardware compatibility considerations for the new software release. ***Read the FCI before you begin a software upgrade.***

The FCI is included on the system software CD-ROM. You can also obtain the latest FCI from Mitel OnLine at www.mitel.com. Note that you must be a registered user to access Mitel OnLine.

Technical Service Bulletins

Technical Service Bulletins (TSBs) are issued by Mitel Technical Support to address frequently asked questions regarding software and hardware problems. Obtain the latest TSBs from Mitel OnLine.

Helpful websites

For definitions of technical terms

- http://www.techweb.com/encyclopedia
- http://www.whatis.com

For networking information

- http://www.practicallynetworked.com
- http://www.networktroubleshooting.com

Terminology

Glossaries are provided in the System Tool help and in the Installation and Maintenance Course Student Manual.

Symbols used in this handbook

A stop symbol indicates a hazardous situation which, if not avoided, could result in injury or death.

A yield symbol with an exclamation mark indicates a situation which, if not avoided, could result in damage to the equipment.

A light bulb identifies an important note or a useful tip.

5 min

A clock indicates the amount of time that is required to perform the associated step.

A pointer symbol identifies an important cross reference.

Important safety instructions

Failure to follow all instructions may result in improper equipment operation and/or risk of electrical shock.

See the system *Safety Instructions* that are shipped with the system for complete safety information.

About the 3100 ICP system

Description

The Mitel Networks™ 3100 Integrated Communications Platform (ICP) provides a complete voice and data solution in one easy-to-manage unit.

The 3100 ICP controller contains the call control software, a router, a layer-2 switch, embedded voice mail with an auto attendant, and a hard-drive for storing voice mail messages and the management tool web pages.

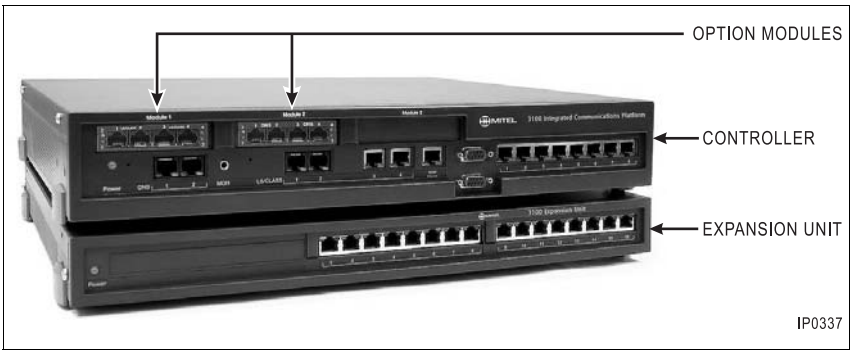

Figure 1: Controller, option modules, and 16-port expansion unit

Basic system configuration

The basic system supports

- 8 Mitel Networks IP (Internet Protocol) Phones
- 2 ONS (on premise station) analog telephones
- 1 wide area network (WAN) Ethernet port for connections to WAN services such as cable or Digital Subscriber Line (DSL)
- 4 LS/CLASS interfaces
- 100 IP devices
- 4 voice mail ports.

Expansion units

You can connect up to two expansion units:

- 16-port expansion unit
- 24-port expansion unit

There are two hardware versions of the 16-port expansion unit. On Release 4.0 versions and later, the ports are located on the front panel starting from the left side of unit. On previous hardware versions of the 16-port expansion units the ports start from the right side of the unit.

The 24-port expansion unit and the Release 4.0 version (and later) of the 16-port expansion unit monitors the power output to the ports. If the expansion unit power supply approaches its maximum output, or if the expansion unit fan fails, all the ports on the expansion unit will be powered down. See for *Table 7 on page 171* for details.

Option Modules

The system supports a maximum of three option modules with the following restrictions:

- Maximum of one T1/E1 Plus module
- Maximum of two 4-port ONS modules
- Maximum of two 4-port LS/CLASS modules
- Maximum of one analog services card.

A fully expanded system

A fully expanded system consists of a controller, fitted with three optional modules, and two 24-port expansion units. It supports

- 56 Mitel Networks IP (Internet Protocol) phones

- 10 analog telephones with Calling Line Identification (CLI) capability.
- Depending upon the type of controller the following lines are supported
  - A North American controller can support a maximum of 12 analog lines, 24 digital lines, or a combination of up to 30 voice lines.
- 1 Wide Area Network (WAN) Ethernet port for connections to WAN services such as cable or DSL
- 200 IP devices
- 8 voice mail ports (T1/E1 Plus card is required to expand from 4 to 8 voice mail ports)

Data functionality

- Integrated 10/100 Mbs layer-2 switch
- Dynamic Host Configuration Protocol (DHCP) server that supports up to 200 IP addresses
- IP Routing / WAN router, Domain Naming System (DNS)
- Remote WAN locations supported through Ethernet WAN interface or dial-up Point-to-Point Protocol (PPP) connections.
- Network Address Translation (NAT)
- Built-in modems (two)
- IP set powering (phantom power).

Voice functionality

- Full set of voice features
- Key System, PBX, or customized system
- Fully featured voice mail and auto attendant.

- T1/D4 protocol for North America
- Primary Rate Interface (PRI) with support for the following protocols: 4ESS, NI2, DMS100, DMS250, and Euro-ISDN.

Licensing

IP phones

For Release 4.0 systems and later, IP phones are not licensed on a port basis. Instead, all the available ports on a controller or expansion unit will support IP phones.

You must purchase licenses for any additional IP phones that you want to connect to the system through a third-party layer-2 switch (that is, any additional IP phones beyond the number of ports that are provided by your controller and expansion units). If you connect an unlicensed IP phone to a third-party layer-2 switch, it will display "Unlicensed" and will not function.

The IP phone licenses that are provided with Release 4 hardware are not supported by previous 3100 ICP software releases.

Voice mail ports

Licenses are available for 6 and 8 ports. In order to obtain 6 or 8 ports, the system must have a T1/E1 Plus module.

T1/E1 Plus MMC option module

- North America: 24 T1/D4 channels, or 23 T1/PRI channels

What telephone features are supported?

Note that the Mitel Networks 5001 and 5005 IP phones are not available in software releases prior to Release 3.1.17.1. Release 4.0 supports the 5200 series of IP phones.

Table 1: Functions and features available on sets

Features	5001 5201	5005 5205	5010 5215	5020 5220	5822	5140 5240
Number of fixed function/application/telephony keys	3	2	6	8	8	13
Number of personal/quick keys	--	20	7	14	14	9
Number of pre-assigned personal/quick keys	--	3	1	1	1	1
Dual or single-colored personal keys	--	single	dual	dual	dual	--
Number of soft command keys	--	--	--	3	3	6
Number of system speed call numbers (short codes) available	1000 system-wide					
LCD display	N	1 line	2 line	2 line	2 line	320x 240 VGA
Headset operation	N	N	Y	Y	Y	Y
Message waiting indicator	Y	Y	Y	Y	Y	Y
Account code - allocate codes (up to 20 digits in length) to incoming or outgoing calls.	Y	Y	Y	Y	Y	Y
Adjust display contrast	N	Y	Y	Y	Y	Y
Adjust handset receiver volume	Y	Y	Y	Y	Y	Y
Adjust ringer pitch	N	N	Y	Y	Y	Y
Adjust volume of the speaker	N	Y	Y	Y	Y	Y
Administrator extension	N	N	N	Y	Y	Y
Alarm calls - setup for other extension users	N	N	N	Admin only	Admin only	Admin only
Alarm calls - setup on own extension	Y	Y	Y	Y	Y	Y
Answer external call via personal/quick key	N	Y	Y	Y	Y	Y
Answer next call via personal/quick key	N	Y	Y	Y	Y	Y

(Page 1 of 7)

Table 1: Functions and features available on sets (continued)

Features	5001 5201	5005 5205	5010 5215	5020 5220	5822	5140 5240
Auto attendant access	Y	Y	Y	Y	Y	Y
Automatically answer incoming external calls (auto answer)	N	N	N	Y	Y	Y
Automatically answer a call and define the type of response to give	N	N	N	N	Y	N
Automatic hold	Y	Y	Y	Y	Y	Y
Bookmarks - enables the extension user to access a list of user-defined URLs.	N	N	N	N	N	Y
Call status information - LCD provides information about status of extension and current call	N	Y	Y	Y	Y	Y
Callback when free	Y	Y	Y	Y	Y	Y
Calls For - identifies diverting extension number	N	Y	Y	Y	Y	Y
Cancel a message waiting request	Y	Y	Y	Y	Y	Y
Cancel call forwarding	Y	Y	Y	Y	Y	Y
Conference call - enable an extension user to set-up a call between three parties	N	Y	Y	Y	Y	Y
Direct Station Select/Busy Lamp Field (DSS/BLF) keys - setup at extension	N	Y	Y	Y	Y	Y
Directed Message Waiting - leave a message for another extension user without calling the extension first	Y	Y	Y	Y	Y	Y
Display caller's number and name	N	Y	Y	Y	Y	Y
Do Not Disturb	Y	Y	Y	Y	Y	Y
Door phone operation	N	Y	Y	Y	Y	Y
Dual Tone Multi-Frequency Tone Dialing	Y	Y	Y	Y	Y	Y

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Table 1: Functions and features available on sets (continued)

Features	5001 5201	5005 5205	5010 5215	5020 5220	5822	5140 5240
Exclusive Hold - place a call on hold which can only be retrieved by the extension that placed the call on hold	N	Y	Y	Y	Y	Y
Extension Groups - extension can be associated with a group	Y	Y	Y	Y	Y	Y
Extension Paging - broadcast a message to a single, group or all extensions on the system	N	Y	Y	Y	Y	Y
Extension-to-extension dialing - user can dial another extension directly	Y	Y	Y	Y	Y	Y
External Call Waiting - indicates that an external call has arrived when an extension user is busy on another call	Y	Y	Y	Y	Y	Y
Follow Me - enables calls to follow an extension user to another extension within the office	Y	Y	Y	Y	Y	Y
Follow Me (I'm Here) - enables an extension user to direct calls from their usual extension to their current extension	Y	Y	Y	Y	Y	Y
Forward all incoming calls to another extension or extension group	Y	Y	Y	Y	Y	Y
Forward calls to an external destination	Y	Y	Y	Y	Y	Y
Forward incoming calls to another extension or extension group if extension is busy	Y	Y	Y	Y	Y	Y
Group Listen - enables others nearby to listen to a call while allowing only the extension user to speak to the other party	N	Y	Y	Y	Y	Y

Table 1: Functions and features available on sets (continued)

Features	5001 5201	5005 5205	5010 5215	5020 5220	5822	5140 5240
Handsfree operation (full) - enables extension users to make and answer calls, and listen and respond to broadcast messages without lifting the handset	N	N	N	Y	Y	Y
Handsfree operation (partial) - enables extension users to make calls and listen to broadcast messages without lifting handset	N	Y	Y	Y	Y	Y
Hotline	Y	Y	Y	Y	Y	Y
Identify Next Call	Y	Y	Y	Y	Y	Y
Immediate Forward- allows you to forward calls that ring your extension on a call-by-call basis.	Y	Y	Y	Y	Y	Y
Intrude into an established call	N	Y	Y	Y	Y	Y
Last Call Duration Display	N	Y	Y	Y	Y	Y
Last Number Redial	Y	Y	Y	Y	Y	Y
List of Calls - display the 10 most recent, different external calls to an extension	N	N	Y	Y	Y	Y
Message Waiting - leave indicator for another extension user	Y	Y	Y	Y	Y	Y
Messaging - enables an extension user to display a message at the calling extension, for example, GONE TO LUNCH	N	Y	Y	Y	Y	Y
Monitor a call between two external parties	N	N	N	Admin only	Admin only	Admin only
Night Service - place a call in night service mode 1 or 2	N	N	N	Admin only	Admin only	Admin only

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Table 1: Functions and features available on sets (continued)

Features	5001 5201	5005 5205	5010 5215	5020 5220	5822	5140 5240
Online Services - enables the extension user to access a list of URLs programmed by the administrator.	N	N	N	N	N	Y
Page via the loudspeaker system	Y	Y	Y	Y	Y	Y
Park an external call for another extension user to retrieve	N	Y	Y	Y	Y	Y
Personal Digital Assistant (PDA) support	N	N	N	Y[1]	N	Y
Personal Directory - create entries specific to extension	N	N	N	Y	Y	Y
Personal speed calls - store under personal, quick keys, or keypad keys	Y	Y	Y	Y	Y	Y
Phonebook	N	N	N	Y	Y	Y
Pick up a call ringing at a colleague's extension	Y	Y	Y	Y	Y	Y
Pick up a call ringing at another extension in the user's extension group	Y	Y	Y	Y	Y	Y
Pick up an incoming call when the system is in Night Service mode 1 or 2	Y	Y	Y	Y	Y	Y
Pick up a parked call	Y	Y	Y	Y	Y	Y
PIN Codes - prevent unauthorised users from making external calls from an extension	Y	Y	Y	Y	Y	Y
Prime Line	N	Y	Y	Y	Y	Y
Priority Line Answer - extension users can answer calls that arrive on a priority line by simply going off-hook.	Y	Y	Y	Y	Y	Y

Table 1: Functions and features available on sets (continued)

Features	5001 5201	5005 5205	5010 5215	5020 5220	5822	5140 5240
Revert on internal calls - transferred internal calls that are unanswered recall/revert to the user who initiated the transfer	Y	Y	Y	Y	Y	Y
Recall on lines	N	Y	Y	Y	Y	Y
Redial List - enables an extension user to save and prioritize ten externally-dialled numbers	N	Y	Y	Y	Y	Y
Re-establish a reverted call - attempts to re-connect the reverted call	N	Y	Y	Y	Y	Y
Ringer On/Off - enables an extension user to turn off the ringer for all incoming calls that arrive under a personal/quick key	N	Y	Y	Y	Y	Y
Selective Ringer - enables an extension user to selectively turn off the ringer for calls that arrive under specific personal/quick key(s)	N	Y	Y	Y	Y	Y
Split Forward - allows the user to set up different forward/divert destinations for internal and external incoming calls	Y	Y	Y	Y	Y	Y
Store a call under a personal/quick key	N	Y	Y	Y	Y	Y
Superkey passcode - allows users to protect access to the Superkey menu by programming a 4-digit passcode	N	Y	Y	Y	Y	Y
Swap	N	Y	Y	Y	Y	Y
System Directory - enables extension users to dial from directory setup by the Administrator	N	N	N	Y	Y	Y
System Hold - place a call on hold which can be retrieved by any extension on the system	N	Y	Y	Y	Y	Y

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Table 1: Functions and features available on sets (continued)

Features	5001 5201	5005 5205	5010 5215	5020 5220	5822	5140 5240
Time and date change	N	N	N	Admin only	Admin only	Admin only
Transfer a call	N	Y	Y	Y	Y	Y
Visual Voice Mail (VVM) - allows the extension user to visually interact with their voice mailbox.	N	N	N	N	N	Y
Voicemail Recall/Revert to Extension Group - redirects an unanswered call that was previously transferred from a specific voice mail port or from the auto attendant to a voice mail group	Y	Y	Y	Y	Y	Y
Who Am I? - indicates the extension number	Y	Y	Y	Y	Y	Y
1. If a Mitel Networks 5423 IRDA Module is attached.						
(Page 7 of 7)						

Chapter 2
Installation

Before you begin

Hardware ports and connectors

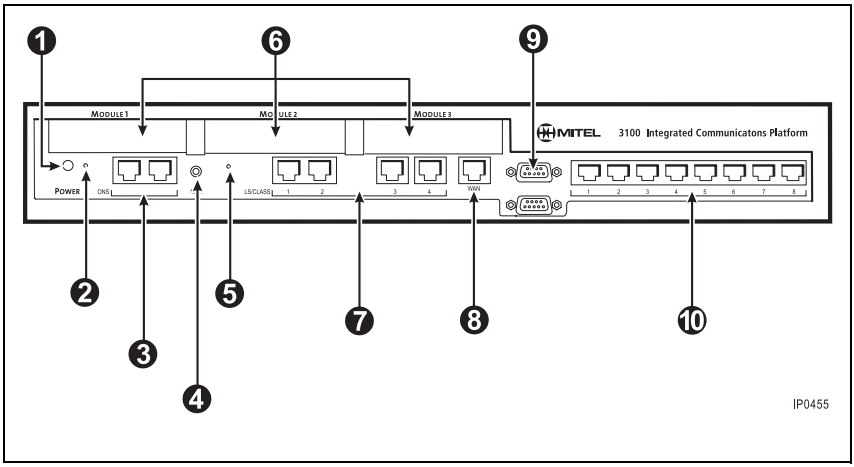

Figure 2: Controller front panel

❶ Power LED

❷ Configure switch

❸ ONS ports (two)

❹ Music on hold socket

❺ Reset switch

❻ Expansion slots for optional modules (three)

❼ LS/CLASS modules (four)

❽ WAN Ethernet port

❾ RS-232 connectors:
Top connector is for call logging (SMDR)
Bottom connector is for diagnostics

❿ Powered Layer-2 Switch ports (eight)

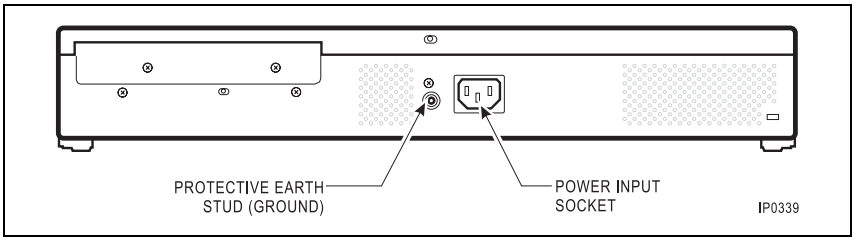

Figure 3: Controller rear panel

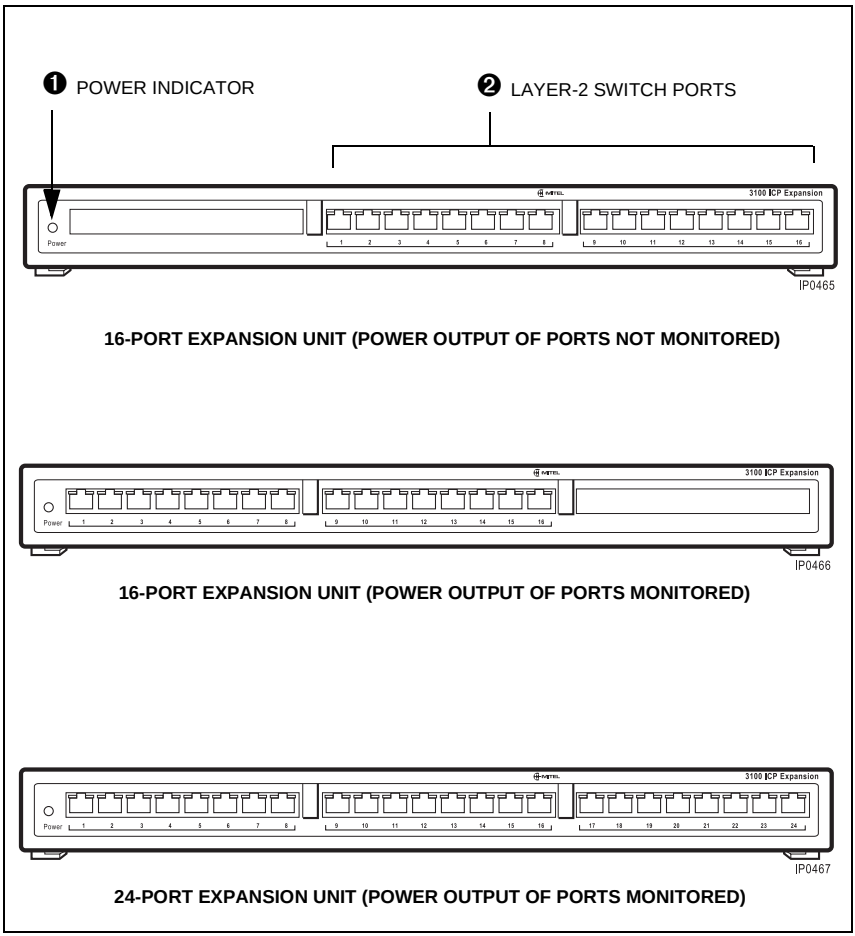

Figure 4: Expansion unit front panels

Controller components

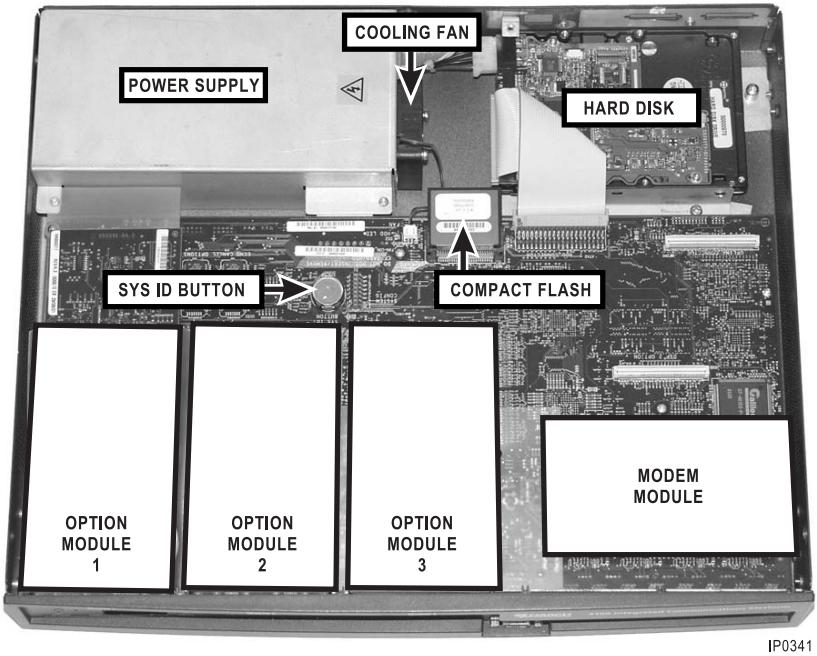

Figure 5: Controller components

Identify the required components

The system size is determined by the type and number of components.

System components	Capabilities
One of the following	
North American Controller (basic configuration)	8 Mitel Networks IP Phones 2 ONS analog telephones 1 wide area network Ethernet or xDSL interface 4 LS/CLASS interfaces 100 IP devices 4 voice mail ports
Plus up to three of the following modules with the following maximums - one T1/E1 Plus module - two 4-port ONS cards - two 4-port LS/CLASS cards - one analog services module	
4-circuit ONS module	Provides connection for four analog phones
LS/CLASS module	Provides connections to four LS/CLASS circuits
T1/E1 Plus module	Provides 8 channels of T1/D4 or T1/E1 traffic. The T1/E1 card is required to obtain the additional 4 voice mail ports.
Analog services module	Provides the following services - LS/CLASS line circuit - OPS (Class A) extension circuit - PFT circuit that connects the LS line circuit to the OPS extension circuit if a power failure occurs - loudspeaker paging port - ONS or door opening relay circuit

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System components	Capabilities
Plus any two of the following	
16-port expansion unit	Provides an additional 16 layer-2 switch ports
24-port expansion unit	Provides an additional 24 layer-2 switch ports
	(Page 2 of 2)

See *Expansion units (p. 8)* for system maximums. Refer to the System Tool online help for examples of system configurations.

Installation checklist

Tools

- ☑ Static strap
- ☑ Phillips screwdriver

Cables and connectors

- ☑ Category 5 (CAT5) cable for all LAN devices (IP phones, computers, servers and so forth)
- ☑ CAT3 or CAT5 cable for analog phones connected to the system
- ☑ RJ-45 cable and connectors
- ☑ RJ-45 crossover (patch) cable. See *Cable pinouts (p. 231)*

PC requirements

- ☑ Windows 95/NT/98/2000/ME/XP PC or laptop

Note: The 5820 Dial From PIM application requires Windows NT/98/2000/ME/XP while the 5822 Softphone requires Windows 98/2000/ME/XP.

- ☑ Internet Explorer version 5.5 with service pack 2, or version 6 (recommended) for client-side rendering

  and

  128 bit encryption.

- ☑ Administrator login privileges for Windows operating system.

Line requirements

- ☑ LS/CLASS lines
- ☑ T1/D4 lines (T1/E1 Plus MMC required)
- ☑ PRI-T1 lines (T1/E1 Plus MMC required)

LAN requirements

- ☑ Pre-installation questionnaire complete
- ☑ Internet Service Provider (ISP)
- ☑ Refer to *Planning your LAN (p. 85)* for additional requirements.
- ☑ Layer-2 switches. The 3100 system does not support the use of hubs for voice traffic. Hubs are a collision based media, and in times of network load, or faulty equipment, voice quality will suffer.

Other

- ☑ Power bar with surge protection
- ☑ Music on hold source (radio, tape player, or .wav file).
- ☑ Call logging printer, call accounting package, or call management application.

Installation overview

- ☑ Install system components
- ☑ Configure the PC
- ☑ Power up the system
- ☑ Launch the tools
- ☑ Run the quick install tool
- ☑ Connect the phones and lines
- ☑ Verify the system
- ☑ Program the system.

Installing the system components

The 3100 ICP system is shipped with the system software installed and includes a default database. Option modules are shipped uninstalled.

If you are upgrading the system with a 24-port expansion unit, T1/E1 Plus module or 5200 series IP phones, you must first upgrade the system to Release 4.0 version software or higher. See *Upgrading the system (p. 133)*. After upgrading the system software, power down the system, install the new hardware, and reboot the system. Refer to the Hardware User Guide for installation instructions.

1. If your system includes option modules, install them in the controller. See *Installing option modules (p. 133).*

2. If your system includes expansion units, install the uplink card in the controller. See *Adding expansion units (p. 135)*.

3. Wall mount the units, rack mount them, or place them on a desk or shelf. Instructions are provided on the installation sheets that are included with the units.

   If you are wall mounting a unit, position it with the front panel facing to one side so that the ports and connectors are accessible.

4. Connect the controller to the expansion units with the uplink cables and Y-power cords. See Figure 18 (page 136) (page 136) or Figure 19 (page 137) (page 137).

5. Connect the ground stud on the rear panel of the controller to a hard-wired ground using 18 AWG (0.75mm 2/) gauge wire. The wire must have green or yellow insulation. Crimp the wire to the ground source.

6. Connect a PC to a layer-2 switch port on the controller.

Do not connect the sets to the controller at this time.

7. Power up the system. See *Powering up the system (p. 132).*

Configuring the PC

Configure your PC to connect to the 3100 ICP system.

Windows 95/98

1. From the **Start** menu, click **Settings** and then click **Control Panel**.
2. In the Control Panel window, double click the **Network** icon.
3. Click **Configuration**.
4. Click the TCP/IP component and then click **Properties**.
5. Select “Obtain an IP address automatically”.
6. Click **OK.**
7. Restart your PC. You are now set up to connect to the 3100 ICP system.

Windows NT

1. Login to the PC with administrator privileges.
2. In the Control Panel window, double click the **Network** icon.
3. Click **Protocols**.

4. Click **TCP/IP Protocols** and then click **Properties**.

5. From the Adapter drop down list, highlight the device that is being used to connect to the 3100 ICP system, then click **Obtain an IP address from a DHCP server**.

6. Click **OK**.

7. Click **Yes** and then restart your PC. You are now set up to connect to the 3100 ICP system.

Windows 2000

1. Login to the PC with administrator privileges.

2. In the Control Panel window, double click the **Network** icon.

3. In the Control Panel window, double click the Network and Dial Up Connections icon. Double click on the Local Area Connection. In the Local Area Connection Status Page, click **Properties**.

4. Click **Obtain an IP address automatically**.

5. From the Adapter drop down list, highlight the device that is being used to connect to the 3100 ICP system, then click **Obtain an IP address from a DHCP server**.

6. Click **OK**. You are now set up to connect to the 3100 ICP system.

Windows ME

1. From the **Start** menu, select the **Settings** tab and then **Control Panel**.

2. In the Control Panel window, double click the Network icon.

3. Select the Configuration tab in the Network window. This window displays a list of installed network components. Highlight the TCP/IP component and click **Properties**.

4. Select the radio button marked **Obtain an IP address automatically**.

5. Click **OK** then restart your PC. You are now set up to connect to the 3100 ICP system.

Windows XP

1. Login to the PC with administrator privileges.

2. From the **Start** menu, select the **Settings** tab and then **Control Panel**.

3. In the Control Panel window, double click the Network and Internet Connection icon. Double click on the Local Area Connection (LAN or High Speed Internet).

4. Click **General** in the Local Area Connection Status page and choose **Properties**.

5. Click **General** tab in the Local Area Connection Properties window. This displays a list of installed components. Highlight Internet Protocol (TCP/IP) and choose **Properties**.

6. Select **Obtain an IP address automatically**.

7. Click **OK**. You are now set up to connect to the 3100 ICP system.

Launching the tools

You can connect a PC or laptop to the 3100 ICP system through

- a LAN drop
- the Ethernet port on the back of the IP Phone
- directly to a layer-2 switch port on the Mitel Networks 3100 ICP controller or expansion unit.

You must configure the PC to accept an IP address from the 3100 ICP system. See *Configuring the PC (p. 29).*

You can also access the 3100 ICP system remotely by dialing into the Mitel Networks 3100 ICP system through a trunk (using the installed V.90 modem) or through the Internet. See *Using a remote access session (p. 144)* for more details.

To launch a tool

1. Launch your browser and go to the following URL:
   http://192.168.1.2
2. Enter your username and password
   Login: **system** (default)
   Password: **mnet** (default)
3. Click
   - Group Administration Tool
   - System Tool, or
   - System Quick Installation Tool

You can only have one system tool session or one Telnet tool session open at any time. The system quick installation tool is only used during the initial configuration of the system.

Running the quick installation tool

About the system quick installation tool

Use the system quick installation tool to configure the basic system parameters and to restore templates. Perform all further programming from the group administration tool or system tool.

The 3100 system automatically discovers the addresses of the IP phones and assigns them extension numbers. After you exit the quick installation tool, auto-discovery is disabled. Any phone that you add later, must be programmed through the system tool.

If you install systems frequently, or if you plan to program the system at a dealer site, you should create a database template and apply it when you run the quick install tool. Using a template reduces the amount of programming required. See *Using a database template (p. 150).*

Key system, PBX, or other?

When you run the quick configuration tool, you are prompted to select one of the following modes

Key System Mode - Incoming calls ring all extensions at the same time (default)

PBX Mode - Incoming calls ring one extension

Other - Allows you to load a database template into the system.

The default is PBX Mode. If you choose to change the mode to Key System or Other, you will have to reboot the system and then restart the quick installation tool. If you change the mode, after you reboot the system, remember to click **Next** the second time that the configuration tool prompts you to select the mode.

Using the system quick installation tool

Do not close your browser window during the quick installation wizard. If you do not complete the wizard, the system configuration will be invalid. If you accidently close your browser, restart the quick installation tool and enter your information again.

You should only use the system quick installation tool once during initial installation.

Note that the system quick installation tool does not allow you to program T1 or PRI lines.

1. Review the system defaults; see *Default Database (p. 195)*.

2. Complete the pre-configuration questionnaire that was shipped with the system.

3. If you plan to change the number of digits in the extension numbering plan (for example, from the default 3-digit extension numbers to 4-digit numbers), you should set up the voice mailboxes through the administration mailbox before you run the quick installation tool. Note that templates for changing the extension numbering plan are available from Mitel Online.

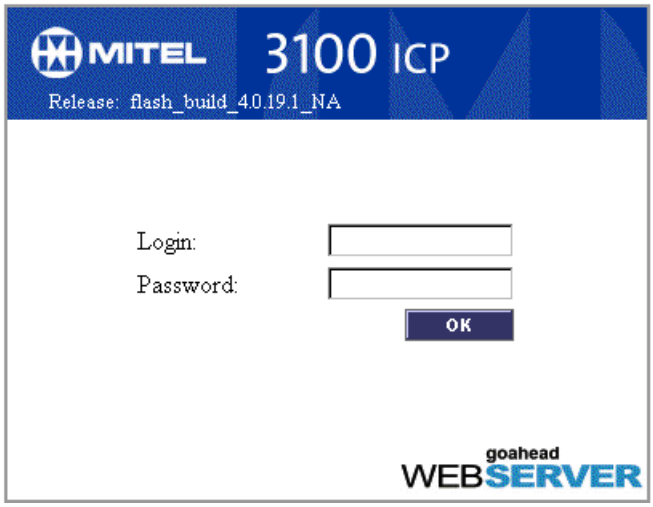
   To set up the voice mailboxes

   - Connect an IP phone to a layer-2 switch port on the controller.
   - Program the mailboxes through the administration set. See *Log in to the administrator station (p. 70)*.
     or
     Program the mailboxes through the System Tool.

4. Open the Internet Explorer browser on your PC.

5. Enter the following URL:
   http://192.168.1.2

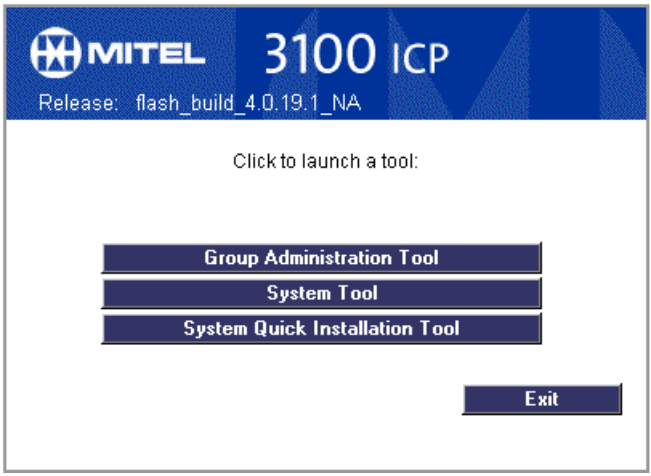
Bookmark the Mitel 3100 ICP login page. The Mitel Networks 3100 ICP login page opens.



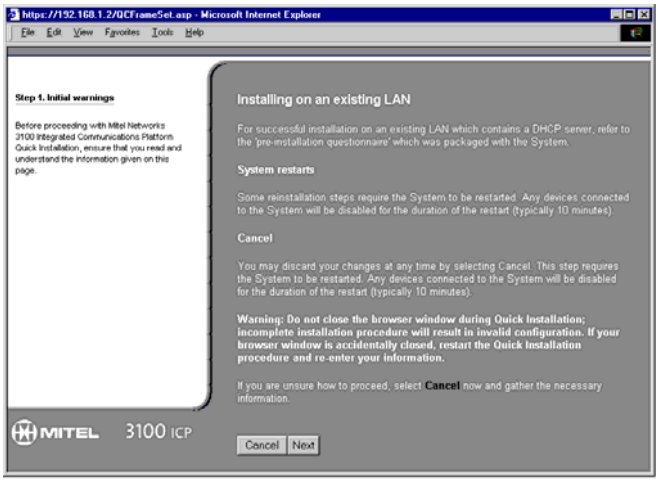
6. In the Mitel Networks 3100 ICP login page, enter
   Login: **system** (default)
   Password: **mnet** (default)

   The login name and password is case sensitive.

7. Click **OK**. The tools page opens.



8. Click **System Quick Installation Tool**. The initial page opens.


https://192.168.1.2/QCFrameSet.asp - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Step 1. Initial warnings
Before proceeding with Mitel Networks 3100 Integrated Communications Platform Quick Installation, ensure that you read and understand the information given on this page.
Installing on an existing LAN
For successful installation on an existing LAN which contains a DHCP server, refer to the 'pre-installation questionnaire' which was packaged with the System.
System restarts
Some reinstallation steps require the System to be restarted. Any devices connected to the System will be disabled for the duration of the restart (typically 10 minutes).
Cancel
You may discard your changes at any time by selecting Cancel. This step requires the System to be restarted. Any devices connected to the System will be disabled for the duration of the restart (typically 10 minutes).
Warning: Do not close the browser window during Quick Installation; incomplete installation procedure will result in invalid configuration. If your browser window is accidentally closed, restart the Quick Installation procedure and re-enter your information.
If you are unsure how to proceed, select Cancel now and gather the necessary information.
MITEL 3100 ICP
Cancel
Next

9. Follow the prompts. When you are prompted to set the management tool accounts, ensure that you change the default password. When you are prompted to connect the phones, refer to *Connect the phones and lines (p. 37)* for additional information.

Connect the phones and lines

When you run the system quick installation script, you will be prompted to connect the IP phones, analog phones and lines to the system. The system will not automatically recognize any IP phone that you connect after the system quick installation tool is finished.

1. Plug the RJ-45 connectors from the IP phones into the layer-2 switch ports on the controller (see Figure 2 (page 21)) and expansion unit (see Figure 4 (page 22)). The first IP phone that you connect to the system is assigned as the administrator station (extension 1000). It's recommended that you connect a Mitel Networks 5220 IP phone or 5240 IP Appliance into port 1 of the controller (port 2 if the system includes a T1/E1 Plus MMC module).

   The default extension numbers for the IP phones are assigned in the order that you connect the phones.

2. Plug the RJ-11 connectors from the analog phones into the ONS ports on the ONS modules.

3. Plug the RJ-11 connectors from the LS/CLASS lines into the line ports.

   If you need to add some IP phones later, you can re-enable the auto registration option through the System Tool. Choose **System**, click **System-wide settings**, click **Change**, and then set **IP set autoregistration enabled** to **True**.

   Power fail transfer: If power to the system fails, the ONS set connected to port 2 (extension 1101) is automatically connected to line 1.

4. If the system includes a T1/E1 Plus MMC module, plug the RJ-45 connector from the digital line into the "T1/E1" port on the T1/E1Plus MMC module. Connect one end of the supplied CAT 5 patch cable into the LAN port. Connect the other end into a layer-2 switch port on the controller (typically you

would connect the cable to port 1). Note that the layer-2 switch port must be on the controller.

If the T1/E1 line is provided from the central office on coaxial cable, you must install an adaptor cable to change it to a CAT 5 cable with an RJ-45 connector. The line must be configured for an impedance of 75 ohms.

Verify the system

Complete the following procedure to verify that the system is working properly.

The system is shipped from the factory with the default options enabled.

1. Dial 675 on each IP phone. The extension number appears in the phone display. Record the extension numbers. The 5140 IP Appliances display their extension number automatically.

2. Verify that you can make calls between the IP phones.

3. Connect an analog phone into the first ONS port on the controller.

4. Verify that you make a call from an IP phone to the analog phone (extension 1100).

5. If your system includes LS/CLASS lines, connect an LS/CLASS line to the first LS/CLASS port on the controller.

6. Place a call into the system and verify that the call rings either the first IP phone (PBX mode) or all IP phones (key system mode).

7. Verify that you can place an external call. Dial 9 to access an external line.

8. If you cannot perform all of the above tasks, check your cable connections. If the problem persists, see *Checking the system LEDs (p. 155)*

9. Proceed to *Programming (p. 41)*.

Installation tips

- The first IP phone that you connect to the system is assigned as the administrator extension (1000).
- The default extension numbers for the IP phones (1000 to 1056) are assigned in the order that you connect the phones, starting with the administrator extension (1000).
- The default extension numbers for the analog phones (1100 to 1109) are assigned to ONS ports (1 to 10).
- The default modem numbers are 1200 and 1210. You dial extension group number 231 to access the modems.
- If you do not want the extension numbers to start with the digit 1, you will have to change the numbering plan first. See *Review the numbering plan (p. 46)*.
- If you reinstall a Mitel Networks 5822 softphone on a different computer, you must delete its Medium Access Control (MAC) address from system programming before you can reassign it to another computer.
- The default IP address of the WAN port is 192.168.0.1.
- The analog services module supports loudspeaker paging. See *Programming a loudspeaker (p. 75)*.

Chapter 3
Programming

Programming overview

This chapter provides the key procedures for programming the system. Refer to the System Tool online help for complete programming information.

Before you begin programming, ensure that you have

- completed the pre-configuration questionnaire that was shipped with the system
- reviewed the default database settings. See *Default Database (p. 195).*

If this is a new installation, typically you will run the quick installation tool first. The quick installation tool guides you through basic programming. See *Using the system quick installation tool (p. 34).*

The key steps to programming the system are

☑ Enable your purchased options

☑ Program the system parameters

☑ Program the extensions

☑ Program the voice parameters

☑ Program the voice mail settings

☑ Set up the auto attendant

☑ Configure call logging (SMDR)

☑ Commit your changes

☑ Perform backups.

About the programming tools

The 3100 ICP system has the following programming tools:

System quick installation tool - Allows technicians to configure basic installation parameters. Use this tool once during initial system installation. Perform all further programming from the other tools.

Group administration tool - Allows an administrator on the customer's site to

- set basic system parameters
- create the system telephone directory
- manage extension and group parameters
- set group parameters
- add, edit, or delete users from the system directory (moves, adds, and changes)
- configure voice mailboxes
- program a user's personal keys with features
- create customized user guides

System tool - Allows qualified technicians to

- program system-wide parameters
- program voice parameters (lines, extensions, management, system directory, and voice mail)
- set up IP networking parameters.

Desktop Tool - Allows users to

- assign features to personal keys
- manage personal contact lists
- manage internet bookmarks on 5140 IP Appliances.

To use the tools, you need a Windows-based computer with Internet Explorer. See *PC requirements (p. 25)* for specific requirements.

Before launching a new tool, you must first exit the current tool and then log in again.

If you restart or reboot the system without committing your saved changes to the database first, your changes will be lost. See *Committing your changes (p. 79)*.

When using the system tool, always click the Exit button to leave the tool.

Tools are password protected

If you enter an incorrect password three times in succession (independent of time or re-starting the system) you will be locked out for 15 minutes. You can disable this lock-out option. See *Changing the system-wide settings (p. 48)*.

Enable your options

If this is a new system and you have purchased options, such as additional voicemail ports or additional IP set licenses, you must enable them. See *Enabling your licensed options (p. 128).*

Programming the system parameters

Set system date and time

You can change the system date and time through the administration tool, the administrator extension (using feature code), or through the system tool. The system tool, however, allows you to set the time using either a 12-hour or 24-hour clock.

1. Launch the system tool. See *Launching the tools (p. 127).*
2. Choose **System**, from the Selection menu.
3. Click **Date and Time** and then click **Change**.
4. Enter the date in the format **dd/mm/yyyy.**
5. Enter the time in either 12 or 24-hour clock in the format **hh:mm:ss**.
6. Specify either 12 or 24-hour clock.
7. Click **Save**.

Review the numbering plan

The numbering plan is flexible. However, if you choose to modify the numbering plan, the programming requirements increase significantly.

See *Numbering plan (p. 195)* for the default numbering plan.

To modify the numbering plan

1. Choose **Voice** from the Selection menu.
2. Click **Management** and then click **Number Plan**.
3. From the list of Leading Digits, click the leading digit that you want to change. Click **Change**.

4. Select the meaning (for example: Attendant) that you want to assign to the leading digit.

5. Click **Save**.

To change the leading digit of the extension numbers, you must

1. Click **Management** and then click **Number Plan.** Set the number plan to allow a different Secondary entry, such as digit 4. The default is leading digit 1.

2. Choose **Voice** from the Selection menu, click **Extensions** and then click **Number Assignment**.

3. Change entries in the Number Assignment form to correspond with the new number scheme (for example, 4360).

4. Do not delete the default Secondary entry-leading digit 1 until you have changed all the numbers in the Number Assignment form (including numbers for entries with no MAC addresses) to the new leading digit.

5. Commit your changes.

Set the login attributes for users

Create user login accounts and assign the users access to the programming tools: system tool, group administration tool, and the desktop tool as required.

It is highly recommended that you change the default usernames and passwords, especially if you are connected to the Internet and do not have a firewall in place.

Create a user login account

1. Choose **System**, from the Selection menu.

2. Click **Login Attributes** and then click **Add**.

3. Enter the login attributes and select the tools access.
4. Click **Save**.
5. After you have created the user accounts, you need to give the 3100 ICP system users their login information for the desktop tool. Send an e-mail to each user which
   - provides the URL to the tools login page
   - identifies the desktop user tool login username and default password
   - instructs the user to change the default password.

   The defaults are

   URL: http://192.168.1.2
   Login username: <user's extension number>
   Default password: <user's extension number>

Changing login access

1. Choose **System** from the Selection menu.
2. Click **Login Attributes**.
3. Select the user's name and click **Change**.
4. Modify the users tools access privileges.
5. Click **Save**.
6. Click **Exit**.
7. Verify the new account by logging in as the new user.

Changing the system-wide settings

1. Choose **System** from the Selection menu.
2. Click **System Wide Setting** and then click **Change**.
3. Set the following:
   - Enable or disable authorization failure lockout

- Leave IP set registration enabled (only applies to quick install tool)
- Enter the name for the system
- Select either internal or external Music On Hold source.

4. Click **Save**.

Identify the power source of the IP phones

IP phones receive their power from the controller power supply. For any system configuration, only eight of the following devices can receive their power from the controller power supply:

- 5140 or 5240 IP Appliances
- IP phones that have an IRDA module or PKM attached.

Any of these devices, beyond the system maximum of eight, must be powered from external power adaptors.

Identify if the sets will receive power from an adaptor or from the controller.

1. Choose **System**, and then click **IP Sets Powering**.
2. Select the port of the phone and click **Change**.
3. Check the **Phantom Feed** box if the set will be powered from the controller (default). If an IP device (NIC card) is connected to the port, the **Phantom Feed** box is cleared automatically.
4. Click **Save**.
5. Proceed to *Program the online services (p. 50).*

If you connect a PC (or other device with a NIC) into a system port, the phantom power for that port is automatically turned off. If you then disconnect the PC and connect an IP phone in it's place, the phone won't function until you re-enable phantom powering for the port.

I5140 and 5240 IP Appliances are only LAN powered via the 8-port controller. Any 5140 and 5240 IP Appliances that are connected to an expansion unit (8, 16, or 24) must be powered by an external AC adapter.

Program the online services

Users of 5140 IP Appliances can press their Online Services key to display a list of internet bookmarks. You can add, change, or delete bookmarks from this list.

1. Choose **System**, click **Online Services Configuration** and then click **Add**.
2. Enter an Item Number. The Item Number (1 to 9) corresponds to the keys located along the right side of the set display. Key 1 is at the top.
3. Enter the label for the bookmark that you want to appear in the display (for example: Mitel Networks). Keep the number of characters in the label under 25.
4. Enter the URL of the site (for example: http:\\www.mitel.com).
5. Click **Save**. You do not need to commit the database for these changes to take effect.
6. Press the Online Services key on a 5140 IP Appliance. Verify that the label appears correctly. Press the associated key and verify the internet site appears in the display.

Programming the extensions

Program the extensions

1. Launch the group administration tool. See *Launching the tools (p. 127)*.
2. Select **I want to Manage Extensions**.
3. Click **View Extension List**.
4. Click **Add** to add extension users, or select an extension and then click **Edit**.
5. Follow the prompts to complete the programming for an extension. Help on the fields is provided in the lower right bubble.
6. Program each extension. If required, enable a voice mailbox for the extension.

Program the groups

After programming the extensions, add them to extension groups. The group administration tool allows you to define the

- Pickup Groups
- Night Service Groups
- Extension Groups.

The default extension group pilot numbers start at 200. By default, all extensions are included in extension group 201. You can put an extension in more than one group.

1. Click **I want to Manage Groups**.
2. Click **Pickup Groups**, select a pickup group number and then click **Edit**. Use the up and down arrow keys to move extensions in or out of the selected group.

3. Click **OK**. Repeat the above step for each pickup group.
4. Program the **Night Service Groups**. Follow the prompts to configure the night service groups.
5. Program the **Extension Groups**. Follow the prompts to configure the extension groups.
6. Click **Done**.

Modify the extension voice mailboxes

Next, modify the voice mailbox settings for each extension.

1. Choose **I want to Manage Extensions**.
2. Click **View Extension List**.
3. Select the first extension and click **Edit**.
4. Click **Modify Voice Mailbox settings**.
5. Follow the prompts to configure the user's voice mailbox.

The default user mailbox passcode is 1111 for newly installed systems. For systems that are upgraded to release 4.0 from a previous version of software, the default pascode is 9999.

6. Click **Done**.
7. Repeat the above procedure for each extension that requires a mailbox.

Program the extension personal keys

The group administration tool also allows you to program an extension user's personal keys with features. Typically, this task is performed by the user from the desktop user tool.

On the 5140 IP Appliance, this feature also assigns labels to the personal keys. The labels appear in the display next to the personal key.

To program a feature on a personal key

1. In the group administration tool, choose **I want to Manage Extensions**.
2. Click an extension and then click **Edit**.
3. Click **Set Up/Edit Desktop**.
4. Click a personal key on the phone display.
5. Select a feature from the list.
6. Click **Assign to key** in the lower right corner of the screen. Follow the prompts to assign the key.
7. After adding all the required features to the personal keys, choose **I want to Return to Group Administrator Tool**.
8. Repeat step 2 to step 7 for each extension.
9. After programming the personal keys on the required extensions, choose **I want to ... Exit**.
10. Go to *Programming the voice parameters (p. 54).*

You can also assign features to personal keys by using the **Superkey** on the IP phone.

Programming the voice parameters

To obtain descriptions of the fields in a form, click **Help**.

Modify the extensions and system directory

You set up the extensions from the group administration tool. You can use the system tool to make any required modifications.

To modify an extension from the system tool.

1. Launch the system tool. See *Launching the tools (p. 127).*
2. Choose **Voice** from the Selection menu.
3. Click **Extensions**.
4. Program the required parameters for the first extension into the following web pages in the order listed below:
   - Number Assignment
   - Directory Name and Allocation
   - Call Pickup Groups
   - Extension Groups
5. Repeat step 4. for each extension.
6. The remaining parameters, for example, Hunt Map, Class of Service, Priority Lines, and so forth, default to typical values. Change them as required.
7. Choose **Voice** from the selection menu, click **System Directory**, click **External Entries** and add the external numbers that you want all system extension users to be able to call:
   - Click **Add**
   - Enter the name
   - Enter the external directory number
   - Click **Save**.

Program the terminal emergency numbers (ELINs)

The Emergency Location Identification Number (ELIN) is a digit string (maximum of 6 digits in length) that identifies the location of an extension when an emergency call is placed from the phone at that extension.

ELINs are only supported for emergency calls placed on ISDN (PRI) lines. If an emergency call is placed on an analog line or T1/E1 line, the ELIN information is not sent to the PSAP.

If you change the physical location that is assigned to a particular ELIN, you must inform the Public Safety Access Point (PSAP) of the new location.

To program and assign ELINs to IP phones

1. Choose **Voice** from the Selection menu, click **Management**, click **Emergency Setup**, and then click **Emergency Numbers**.
2. Click **Add** and then enter the emergency number(s), for example 911.
3. Click **System ELINs** and then click **Change**.
4. Enter an ELIN against an ELIN index. An ELIN can be a maximum of 6 digits in length.
5. Enter a description (up to 20 digits) in length to describe the location covered by the ELIN. Note that this description is not passed on to the PSAP.
6. Click **Save**.
7. Click **Extension**, click **Terminal ELINs**, select the extension and then click **Change**.
8. Select the index number of the ELIN that you want to assign to the extension. By default, every extension is assigned ELIN index 0.
9. Click **Save**.

About the default line numbers

North America

Line numbersLine Type
1 to 16Analog
37 to 59T1/D4 or T1/PRI

Program the general line parameters

After programming the extensions and extension groups through the group administration tool, program the lines from the system tool.

Assign lines to groups

1. Click **Lines and Trunks**, click **Lines and Trunk Management** and then click **Groups**.
2. Select the line and click **Change**.
3. Select the line access type. On a system with only a few lines, you would typically place all the lines in one group and define the group with **Both** access (default).
4. Select the line group that you want the line to belong to. Only lines of identical type and mode can be grouped together (that is, you can't mix analog and digital lines).
   - Each line can be assigned to only one line group.
   - By default all analog lines are in Line Group 1
   - By default all digital lines are in Line Group 2.
5. Click **Save**.

Program the extension hunt maps

Hunt maps allow extensions to access lines. Hunt maps define which line groups each extension can access. The system "hunts" for an available line in the order that the line groups are programmed into the extension's Hunt map.

1. Click **Extensions** and then click **Hunt Map**.
2. Select the extension and click **Change**.
3. Select the line groups that you want this extension to have access to.

   If the outgoing access digit is set to Any Line, when the user at this extension dials the outgoing access digit, the system hunts for a free line in the line group that you assigned against Entry 1. If a line is not available, it will hunt for a line in the line group against Entry 2.

   In order to make outgoing calls, each extension must be assigned to at least one hunt map.
4. Click **Save**.

Define the outgoing line access digit

By default users dial 9 to access an external line. If you want to change the leading digit for accessing an outgoing line or add another out access digit, you must change it in the Out Access form and in the Numbering Plan form.

Program the analog lines

The default configuration allows all calls to be routed to extension 1000 in pbx mode, or to all extensions in key system mode.

Ring maps determine which extensions or extension groups receive the incoming calls from a line. Ring maps are configured on a per-line basis. Every line requires a ring map.

To customize your configuration, you will need to program the

- analog line parameters
- ring maps
- ring map types

Configure the analog line parameters

1. Choose **Voice** from the Selection menu.
2. Click **Lines and Trunks**, click Analog **Lines** and then click Analog Line Parameters.
3. Select the line and click **Change**.
4. Set the required line parameters.
5. Click **Save**.

Configure the ring maps

1. Click **Lines and Trunks**, click **Line and Trunk Management**, and then click **Ring Map**.
2. Select the line and click **Change**.
3. Configure the Day and Night Entries for the line.
4. Click **Save**.

Configure the ring map type

1. Click **Lines and Trunk Management** and then click **Ring Map Type**.
2. Select the line and click **Change**.
3. Select either Standard or Cyclic.

   If you have programmed more than one extension group in the Ring Map form, you should set the Ring Type to Cyclic.
4. Click **Save**.

Program the digital trunks

Digital trunks are supported by the following option modules

- T1/E1 Plus module

If you change the digital protocol for a trunk in the Digital Link Assignment form, you must reboot the system for the change to take effect.

Before you install the T1/E1 MMC Plus, you must first upgrade the system to Release 4.0 software. Ensure that you connect the LAN port on the module to a layer-2 switch port on the system controller.

About the digital trunk forms

You use the following forms to program digital trunks:

- Card Configuration - displays the cards (onboard and optional) that are installed and programmed in the system
- Digital Link Descriptor Summary - displays all the link descriptors programmed in the system
- Digital Link Assignment - allows you to assign link descriptors to digital links on a per-link basis.
- Trunk Circuit Descriptor Summary - displays a list of all the trunk circuit descriptors on the system.
- Trunk Assignment - allows you to assign a trunk circuit descriptor to each trunk in the system
- Network Synchronization - allows you to define the external clock source for network synchronization.
- Protocol Assignment - allows you to set the protocol variant for the PRI links
- Digital Link Descriptors - defines the protocol and physical characteristics for the link: PRI-T1 and T1/D4
- Digital Trunk Circuit Descriptor - allows you to assign signaling and timing parameters to groups of trunk circuits

Program the Digital Card Configuration

You must program the option modules that support the digital lines into the system.

1. In the system tool, choose **Voice** from the Selection menu.
2. Click **Lines and Trunks**, click **Digital Line and Trunking**, and then click **Card Configuration**.
3. Select the installed module (for example T1/E1 Plus module) and then click **Change**.
4. Select the Programmed Card Type (for example, T1/E1 Plus module).
5. Click **Save**.

Configure the links

1. In the system tool, choose **Voice** from the Selection menu.
2. Click **Lines and Trunks**, click **Digital Line and Trunking** and then click **Digital Link Descriptor Summary**. Note the type of descriptors currently programmed.
3. Click **Digital Link Descriptors** and then click the required link descriptor form
   - Digital PRI-T1 Link Descriptor Assignment
   - Digital PRI-E1 Link Descriptor Assignment
   - Digital T1/D4 Link Descriptor Assignment

   These forms allow you to define the protocol and physical characteristics of the link. Note that you can only program these digital link descriptors against links that have a programmed card type of T1/E1 Plus module.

Note that default link descriptors are included with the system. If you choose to use the defaults, you can skip to step 6..

4. Select the Link Descriptor number and then click **Change**.

5. Modify the fields as required. Click **Help** for a description of the fields. Click **Save**.

6. Click **Digital Link Assignment**, click a link number, and then click **Change**. Select the required digital link descriptor name. Enter a description of the link usage in the comment field and click **Save**.
   - The selected link descriptor type must be compatible with the programmed card type.
   - Before you change a digital link descriptor, busy out all the trunks that are associated with the link. Trunks are associated with a link in the Trunk Assignment form. See *Using maintenance commands (p. 162)*
   - If you change a digital link descriptor type for a link, you must commit your programming and then reboot the system in order for the change to take effect.

7. Click **Network Synchronization**, select the Clock Source Priority (1 to 5) and then click **Change**.
   - Select the location of the external clock source (1 to 6 for option modules; 7 to 10 for onboard BRI). If you don't define an external source, network synchronization is provided by the system clock. Any connected digital links will then run in free-run mode.
   - Select the Link Number (1 or 2)
   - Set the number of allowable slips in a 24-hour period (0 to 9000). Set the Slip rate to 50 (default) for a network that contains only Mitel systems; set it to at least 75 for networks that include non-Mitel systems.
   - Click **Save**.

Do not use a T1 connection from a 3100 ICP as the synchronization source for another 3100 ICP system

or a timing loop could result. The Stratum 4 clock on the 3100 ICP system can only synchronize off of a Stratum 4 clock or higher (one clock in freerun mode and the other in synchronization mode).

8. Commit your digital programming to the database. See *Committing your changes (p. 79)*.

Program the PRI specific parameters

This section applies to systems that support PRI lines. For PRI links, program the

- PRI protocol type and variant

PRI channels are mapped to call control line instances 37 to 59 regardless of which slot the T1/E1 is installed in.

To program the PRI parameters

1. .Click **Management** and then click **Global CLI**.
2. Click **Change**.
3. Enter the following parameters:
   - Outgoing Global CLI
   - International
   - National
   - Subscriber
   - Unknown
   - Redial CLI Method.
4. Click **Save**.
5. Click **Lines and Trunks**, click **Digital Line and Trunking**, click **Protocol Assignment**, select a link and then click **Change**.
6. Set the required protocol for the link (DMS100, DMS200, 4ESS, NI2, or Euro-ISDN) and enter a comment in the Comment field.

7. Set the Protocol Variant according to the following table:

Protocol	Variant	Interface Type
DMS100	Not applicable	T1
DMS200	Not applicable	T1
4ESS	Not applicable	T1
NI2	Bellcore	T1
	5ESS	T1
	GTD5	T1

8. Click **Save**.

Configure the trunks

1. Click **Trunk Circuit Descriptor Summary**. Note the type of descriptors currently programmed.
2. Click **Digital Trunk Circuit Descriptors** and then click the required descriptor form
   - Digital E and M Trunk Circuit Descriptor
   - Digital CO Trunk Circuit Descriptor
   - Digital DID Trunk Circuit Descriptor
   - Digital PRI Trunk Circuit Descriptor

   These forms allow you to assign signaling and timing parameters to the trunk circuits.

   Note that default descriptors are included with the system. If you choose to use the defaults, you can skip to step 6..
3. Click the desired descriptor number, click **Change** and modify the fields as required. Click **Help** for a description of the fields. Click **Save**.

4. Click **Trunk Assignment**, click the desired trunk circuit/channel and then click **Change**. Assign an appropriate Trunk Circuit Descriptor to each trunk circuit/channel, identify if the trunk is a DID trunk and then click **Save**.

   The trunk circuit descriptor that you assign to the trunk must be compatible with the link descriptor that you assigned to the link in the Digital Link Assignment form.

5. Repeat step 4. for each trunk circuit.

6. For non-DID/DDI trunks, configure the ring maps and ring map types. See *Configure the ring maps (p. 58)* and *Configure the ring map type (p. 58)*.

7. For DID trunks, proceed to *Configure DID lines (p. 64)*

Configure DID lines

To configure Direct Inward Dial, you must

- program the DDI mappings
- set the DDI Digit conversion for outgoing calls
- configure the network response for the extensions.

Program the DID mappings

1. Click **Management**, click DID **Mapping**, and then click **Add**.

2. Enter the DDIDID digits required to call the DID Target (maximum of 6 digits).

3. Select the target type (Short Code, Extension, Extension Group, or VPN).

4. Enter the number of the DID target (maximum of 6 digits).

5. Set the Day and Night Service options.

6. Select Global CLI if you want outgoing calls from a target extension to display the Calling Line Identifier (CLI) number.

7. Click **Save**.

Set the DID Digit conversion for outgoing calls

1. Click **Management** and then click **Outgoing** DID **Digit Conversion.**

2. Select the DID Digit (index number) of the line.

3. Click **Change**.

4. Select the Converted Digit Parameter to change the extension numbers back to the correct DID range.

5. Click **Save**.

Configure the network response for the extensions

1. From the **Selection** menu, choose **Voice**, click **Extensions** and then click **Network Response**.

2. Select the first extension, click **Change** and select the required network response to a Direct Dial In (DDI) call. The options are
   - **Queue:** camp incoming calls on the extension until answered
   - **Busy:** send busy tone to calling party
   - **Redirect (default):** redirect caller to attendant
3. Click **Save**.
4. Repeat the above steps for each extension.

Assign priority lines

You can answer external calls that arrive on a priority line by simply going off-hook. To answer calls that arrive on a non-priority line, you must press the Intercom key or Prime line key.

If you want users to be able to answer all incoming external calls by simply going off-hook, assign all lines as priority lines for all extensions.

Priority lines not apply to internal calls.

In North America, all lines default to priority lines for all extensions.

1. Choose **Voice** from the Selection menu.
2. Click **Extensions** and then click **Priority Lines**.
3. Select the extension.

   To add a priority line for an extension
   - Click **Add Member.**
   - Select the number of the line that you want to add as a priority line.
   - Click **Save**
   - Repeat the above steps for each line.

   To delete a priority line from the extension
   - Click **Delete Member**.
   - Select the priority line that you want to delete
   - Click **Delete**.

   To add or remove all lines
   - Click **Change**.
   - Select **Add all lines** or **Delete all lines**.
   - Click **Save**.

Restrict external access (toll restriction/call barring)

You use restriction group levels to restrict the external numbers that extension users can call. Using class of service levels, you can control which extensions have access to external lines, local, national, and international calls. You can also program up to 20 exceptions for each group in the Global Exception form.

Note that in Release 4.0, you use the “x” character instead of an “∗” to specify a wild card digit in the Toll Restriction forms.

Set up restriction groups

Restrictions are applied from the highest restriction number to the lowest. The highest number being the least restricted; the lowest being the most restricted. See *Restriction groups (extensions) (p. 202)*. You can only modify restriction groups 1 to 5.

1. In the system tool, choose **Voice** from the Selection menu.
2. Click **Management**, click Toll Restriction, and then click **Restriction Groups**.
3. Select the Restriction Group Number and then click **Change**.
4. Enter the restricted digits. Extension users will be unable to dial numbers that begin with the restricted digits. For example, if you enter the digit 1, then extensions assigned to this group will be prevented from making long distance calls.
5. Enter the maximum number of digits that users are allowed to dial. Any digit dialed beyond the maximum number will terminate the call. The default setting (0) is unlimited number of digits.

You can also specify number strings that are exempted from the restriction group.

1. Click **Add Member**.
2. Enter the number (digit string) that you want extension users in the restriction group to be able to call.
3. Click **Save**.

Assign class of service (restriction groups) to users

1. Choose **Voice** from the Selection menu.
2. Click **Extensions** and then click **Class of Service**.
3. Select the extension and then click **Change**.
4. Select the Class of Service (Restriction Group number) that you want to assign to the extension.
5. Click **Save**.

Program the global exception/restriction strings

Global exception strings and global restriction strings bypass all other toll restriction settings.

To program global exceptions

1. Choose **Voice** from the Selection menu.
2. Click **Management**, click Toll Restriction, and then click **Global Exception Strings**.
3. Click **Add**.
4. Enter the global exception string. For example, you should program emergency numbers (911 or 999) as global exception strings to ensure that all extensions are allowed to call them.
5. Click **Save**.

To program global restrictions

1. Choose **Voice** from the Selection menu.
2. Click **Management**, click Toll Restriction, and then click **Global Restricted Strings**.
3. Click **Add**.

4. Enter the global restriction string. You can enter up to eight digit strings that no extension can dial (for example 1900).

5. Click **Save**.

Set the Toll Restriction Matrix

You can either allow or prevent

- Line to line routing (default is no)
- Line to line transfer (default is no)
- Line to line three-party conference (default is yes)

1. Choose **Voice** from the Selection menu.
2. Click **Management,** click Toll Restriction, and then click Toll Restriction **Matrix**.
3. Click **Change**.
4. Configure the Toll Restriction Matrix settings. These settings are system-wide.
5. Click **Save**.

Program the voice management parameters

1. Choose **Voice** from the Selection menu.
2. Click **Management**.
3. Program the required parameters into the following web pages in the order listed below:
   - Out Access
   - Timers (see page 202 for defaults)
4. The remaining parameters, default to typical values. Change them as desired.

Programming the voice mail settings

The 3100 ICP system includes an imbedded voice mail system. To set up the voice mail system

1. Choose **Voice** from the Selection menu
2. Click **Voicemail**.
3. Program the following forms in the order listed below

- System Settings -> Voicemail Prompt Language
- Voice Mailboxes
- System Greetings -> Greetings Definition
- System Greetings -> Greetings Assignment
- System Settings -> Voicemail Options
- System Settings -> Business Hours
- System Setting -> FAX Detection

For descriptions of the parameters, refer to the system tool online help.

Setting up the auto attendant

The embedded voice mail system includes an auto attendant. Setting up the auto attendant involves logging in as the administrator and then recording the greetings.

Log in to the administrator station

You must log in to the system administrator's mailbox to record system greetings.

1. From any internal telephone, lift the handset and obtain dial tone.

2. Dial the auto attendant number (default 232). The system answers and plays the greeting.

3. If there is no mailbox associated with the extension, you will be prompted for a mailbox number. Enter the system administrator mailbox number (default 99, 999, or 9999 depending on the number of digits in your extension numbers).

   If there is a mailbox associated with the extension, you will be prompted for the mailbox passcode. Press ∗ and then enter the system administrator mailbox number.

   The system prompts you for a passcode.

4. Enter the passcode for the System Administrator's mailbox (default 1234).

   You are now logged in to the system administrator's mailbox. Follow the voice prompts for instructions or refer to *Record the system greetings (p. 71)*.

Record the system greetings

Greetings are recorded by accessing the administrator's mailbox from any internal telephone. Access to the mailbox requires a passcode.

1. Log in to the system administrator's mailbox.

2. Press **[4]** for the System Greetings menu.

3. Press **[1]** to set the primary greeting

   - or-

   [2] through **[9]**, for an alternate greeting set.

4. If prompted, press **[1]** to assign greetings in the default system language or **[2]** for the alternate language.

5. Press **[1]** for an Open greeting (during business hours).

-or-

Press **[2]** for a Closed greeting (after business hours).

6. If prompted, press **[1]** to assign greetings in the default system language or **[2]** for the alternate language.

7. Record the greeting speaking clearly into the handset, not a speaker phone. Use the following example as a guide.

   "*Thank you for calling ABC Industries. If you know the number of the person you are calling, enter it now. For a company directory, press 9. For assistance, press 0 or hold for the operator. To repeat the menu options press, 3*"

8. Press any key to stop recording.

9. After recording, select one of the following options:

   [1] Accept

   [2] Review

   [3] Re-record

   [*] Cancel

10. If you are recording additional alternate greetings, repeat the above procedure beginning at step 2. Do likewise to record greetings in the other language.

Record the bilingual welcome greeting

If you have the bilingual voice mail option enabled, the auto attendant plays a bilingual welcome greeting when it answers an outside call. You record the greeting in the two languages selected in Voice Mail Prompt Language Form. Include in the greeting an instruction to callers to dial the Language Change Mailbox number (as specified in for service in the alternate language). The default Language Change Mailbox number is 8.

The Bilingual Welcome Greeting is only available if the Bilingual Voice Prompts Option is enabled in the Voice Mail Prompt Language form.

1. Log in to the system administrator's mailbox. See *Log in to the administrator station (p. 70).*
2. Press **[4]** for the system greetings menu.
3. Press **[1]** to set the primary greeting.
4. Press **[4]** to set the bilingual welcome greeting.
5. Record the greeting, speaking clearly into a handset, not a speaker phone. The following, is a typical bilingual in English and French:

   "*Thank you for calling ABC Industries. Merci d'appeler les Industries ABC. Pour le service en francais, composez 8.*"
6. Press any key to stop recording.
7. After finishing, select one of the following options:

   [1] Accept

   [2] Review

   [3] Re-record

   [*] Cancel

Configuring call logging (SMDR)

You can connect a printer to the system to obtain basic call recording, or connect a PC that is running a call accounting/management application to obtain more sophisticated reports.

You can also save call logs to a file on your PC. See *Saving call (SMDR) logs (p. 143).*

1. Using an RS-232 cable, connect the printer or PC to the call logging (SMDR) port on the front of the controller (see Figure 6 (page 74)).

Refer to *Serial port pinouts (p. 226)* for the pinouts. The port settings are 9600 baud, 8 bits, No Parity and 1 stop bit (9600 8N1).

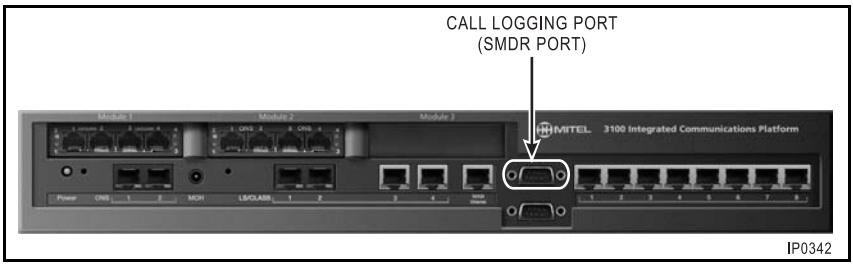


Figure 6: Call logging port

2. Launch the system tool.
3. Choose **Voice** from the Selection menu.
4. Click **Management**, click **Call Logging**, and then click **Change**.
5. Set the following parameters:
   - Set the cost per meter pulse (00 to 999.9). This functionality is not supported in NA systems
   - Set the minimum call duration to be recorded (00.00.00 to 23:59:59)
   - Select the type of calls that you want recorded
   - Set the minimum page length (between 10 and 225 lines) for the report. The default is 66 lines.
6. Click **Save**.

For descriptions of the call logs, refer to *Call logging (SMDR) details (p. 209).*

Programming a loudspeaker

You can connect an external loudspeaker to the system

- through the analog services module (recommended method), or
- through a loop start trunk that must be dedicated to the loudspeaker.

Through the analog services module

1. Install the analog services module (ASM).
2. Connect the external loudspeaker to the loudspeaker port (Port 4) on the analog services module.
3. Program the loudspeaker circuit into a line group to allow extensions access to the circuit (it's handled like a line).
4. In the Hunt Map form, reference each extension to the line group that contains the paging port line. This step allows the extensions to have access to the paging port.

   Note the following:

- Extension 1600 by default is the extension number that users call to access the paging port on the ASM.
- The line numbering is based on the position of the module within the controller. For example with an analog base controller, lines 1-4 are found on the base controller. If the ASM is installed in slot 1 then the line number for the paging port will be Line 6 (ASM has another line on the card at port 1). If an additional LS module is installed in slot 1 and the ASM module is in Slot 2 or 3 then the line number for the paging port is 10.

- An extension user may also make announcements via an extension's loudspeaker. Refer to Extension Paging in the System Tool online help for information.
- Only one extension user can make an announcement via the loudspeaker system at any one time.
- Any extension on the system can page via the loudspeaker system; provided programming is correct.
- The administrator must set up the extensions that are capable of paging via the loudspeaker system.
- DDI calls to the extension designated for loudspeaker paging are not allowed.
- An operator can transfer an external caller to the designated loudspeaker extension to make an announcement, if transfer permissions allow.
- Extension number 1600 (by default) is the default extension number for the paging extension.
- Users can initiate a page by pressing the pre-programmed paging DSS/BLF key (programmed via the Superkey) or by dialing the pre-assigned paging extension number (1600);
- There is no time limit on the length of an announcement;
- Number unobtainable tone is heard if an extension user, without the correct permissions, attempts to access the paging extension;
- If the paging system is in use and an extension user attempts to connect to the Paging extension the extension user hears busy tone;
- An error beep is heard is an extension user attempts to place the Paging extension on hold;

- DTMF tone dialing is disabled on the Paging extension.
- A Message Waiting indication cannot be placed on the paging extension -- the extension user hears re-order tone;
- An extension user cannot forward calls to the paging extension
- Callbacks can be placed on the paging extension
- An operator can transfer an external call to the paging extension.

Through a loop start trunk

1. Choose a loop start trunk port that you want to dedicate to the external loudspeaker system.
2. Connect the loudspeaker system to the port.
3. In the system tool, choose **Voice** from the Selection menu, click **Lines and Trunks**, click **Lines and Trunk Management**, and then click **Groups**.
4. Select the line number that you want to use for the loudspeaker system, and then click **Change**.
5. Assign the line to an unused Line Group Number. Do not select line group 1, 2, 6, 9, or 0. Do not assign any other lines to the selected line group.
6. Click **Save**.
7. Click **Lines and Trunks**, click **Analog Lines**, click **Analog Configuration**, click the line group number that you selected in step 5. and then click **Change**.
8. Set the Dial Tone Detection to **No** and click **Save**.
9. Click **Management**, click **Number Plan**, select the Leading Digit that you want to use to access the loudspeaker, and then click **Change**.

10. Change the Leading Digit Meaning to "Out Access", and then click **Save**.

11. Click **Management**, click **Out Access**, click the Leading Digit you selected in step 9., and then click **Change**.

12. Change the "Out Access Type" from "Any Line" to "Line Group". Set the Out Access Parameter to the Line Group Number that you chose in step 4., and then click **Save**.

13. In the Out Access form, select the Leading Digit that you chose in step 9., and then click **Change**.

14. Change the Out Access Type from "Any Line" to "Line Group", set the Out Access Parameter to "1", and then click **Save**.

15. Click **Voice**, click **Extensions**, click **Hunt Map** and then click **Change**.

16. For each extension that requires access to the loudspeaker,
    - select the extension and click **Change**
    - change the Hunt Map Entry 2 to the line group number of the loudspeaker
    - click **Save**.

17. Commit the database.

18. From each of the designated extensions, dial the Leading Digit that you selected in step 9. and verify that you can make a loudspeaker announcement.

Only one extension user can access the loudspeaker at any time.

You may have to disable Loop Detection in the Analog Configuration form to enable the loudspeaker.

Committing your changes

You must commit the programming changes that you have made through the system tool to the database. Some of your saved changes (for example, changing extension numbers) are not applied to the system until you commit them.

1. Choose **System** from the Selection menu.
2. Click **Commit Databases**.
3. Read the instructions and click **Proceed**.

15 sec to 5 min

The system displays “Operation Successful” when the database is updated.

Performing a database backup

At the end of your programming session backup the database; see *Backing up the database (p. 141)*.

Programming tips

- For programming considerations related to phone features, click **Help**, click **Feature Descriptions** in the Table of Contents, and then click **Features**.
- At the end your programming session, remember to commit your changes before your exit the system tool.
- If you change the extension’s number or set type of an IP phone, you must reset the phone before your change will take effect. See *Changing extensions or set types (p. 148)*.

- When you are programming MAC addresses into the system you must separate the HEX numbers with a colon (:).
- You must purchase licenses for any additional IP phones that you want to connect to the system through a third-party layer-2 switch (that is, any additional IP phones beyond the number of ports that are provided by your controller and expansion units).
- After you finish a programming session with any of the tools, close all the associated IE windows, by using the "EXIT" button. Do not use the button (except from the main login screen).
- Only Internet Explorer 5.5 browsers and later are supported.
- If a set is in busy state, with no call forward turned on, the caller will hear ring no answer until the extension goes on hook or until the caller hangs up. To determine if call forwarding has been set on an extension, lift the receiver and listen to the dial tone. A stutter dial tone at the start of regular dial tone indicates that call forward is set up.
- The Desktop Tool does not support 5001 or 5201 IP phones.

Chapter 4
Configuring the IP network

About IP networking

The 3100 ICP system provides small and medium-sized businesses with a Local Area Network (LAN) and Internet connectivity. This chapter provides step-by-step procedures for

- connecting the system directly to the Internet through a cable or DSL modem using
  - static IP addressing
  - a DHCP client (typically used with a cable modem)
  - PPPoE (typically used with a DSL modem)
- connecting the system to an existing LAN through
  - the WAN Ethernet port (Net 2)
  - through a layer-2 switch port (Net 3)
- using a remote DHCP server
- changing the assigned DHCP IP address range
- configuring Domain Naming Service (DNS)
- assigning a gateway
- programming dial-up access to an ISP
- restricting external access with a firewall.

Only qualified Network Engineers should install the 3100 ICP system into an existing LAN.

Refer to the IP Routing section of the System Tool online help for detailed IP networking information.

Network capabilities

The 3100 ICP system provides

- a layer-2 switch that allows LAN devices such as IP phones and computers to connect to each other
- a built-in router that allows LAN users to connect to the Internet
- Network Address Translation (NAT) capabilities
- Domain Name Service (DNS) that resolves local names and forwards other requests
- a Dynamic Host Configuration Protocol (DHCP) server that automatically assigns LAN devices with IP addresses.

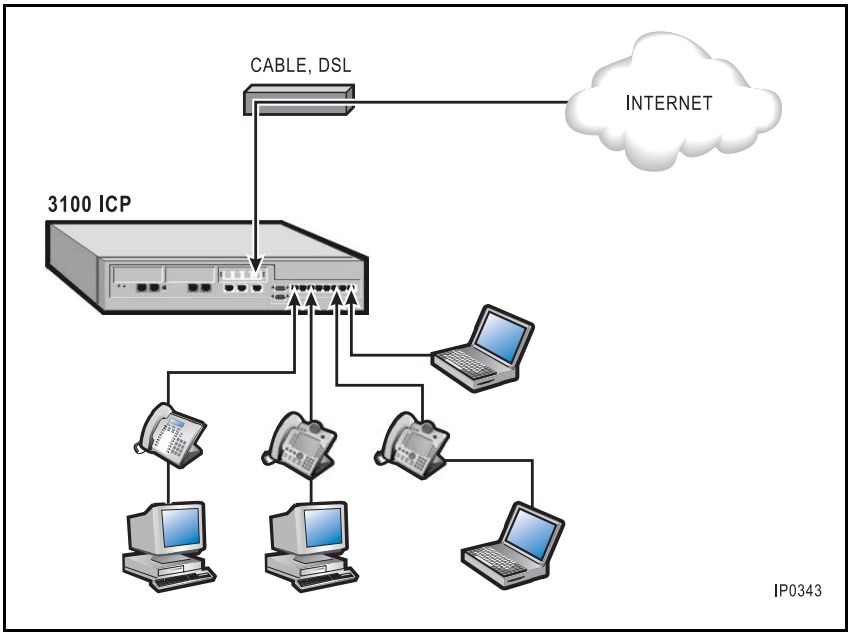


Figure 7: Standalone network application

Planning your LAN

Question	Answer
Will you connect to a private network or virtual private network (VPN)? What are the IP addresses, gateway address, and subnet mask required for the 3100 ICP sub network? or Will you use a remote DHCP server?	
Internal configuration questions	
How many IP phones are you going to connect to the system (0 to 56)?	
How many computers are you going to connect to the system (100 maximum)?	
Will these computers use the DHCP server in the 3100 ICP system controller?	
Will you connect to the internet through the WAN or through a layer-2 switch port?	
What are the IP addresses, gateway addresses, and subnet masks used in the network?	
External configuration questions	
What type of external connection will you use? Dial-up, xDLS, cable, or other?	
Will you connect the system to an existing LAN?	
Will you use the WAN port or a layer-2 switch port?	
What type of authentication is required? Username Password PPP security type	

In configurations where you are using the DHCP services of the 3100 ICP controller and Network Address Translation (NAT) on the WAN port, you should not need to modify the 3100 ICP DHCP settings. The default IP addressing on the 3100 ICP system is suitable for 90% of all installations.

Ensure that your DSL service provider does not block the use of other outgoing e-mail services (Simple Mail Transfer Protocol). Some DSL service providers block other outgoing e-mail services to prevent network users from using their service for e-mail spamming.

Default controller IP addresses

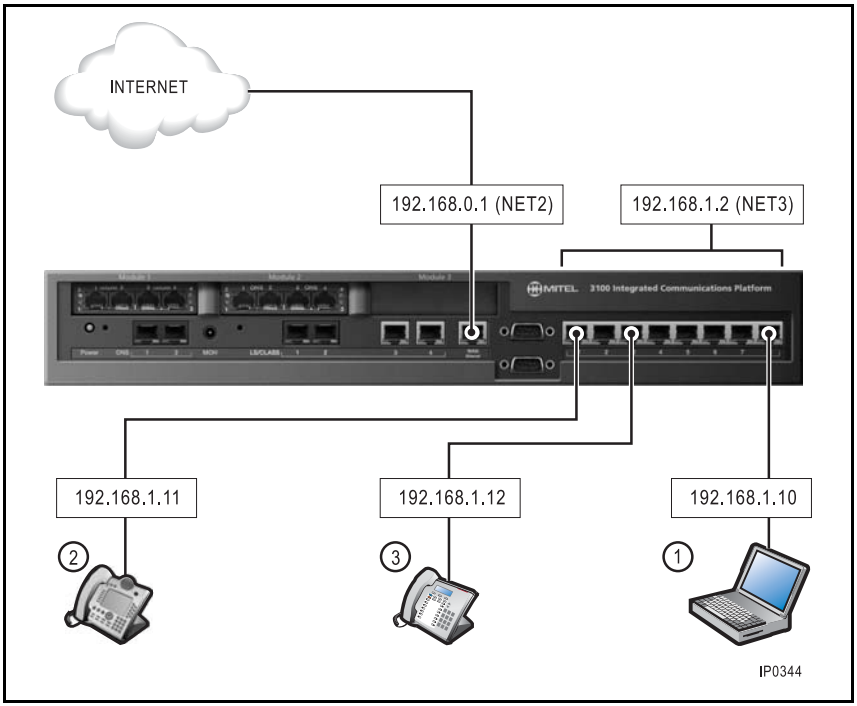


Figure 8: Default IP controller addresses

IP programming sequence

For most installations the default IP networking settings are acceptable for Net 3. However, for those sites that require modifications to the defaults, the recommended programming sequence for the networking forms is

- DHCP/DHCP Server/DHCP Subnet
- DHCP/DHCP Server/DHCP IP Address Range
- DHCP/DHCP Server/DHCP Options
- Router/Destinations
- Router/IP Routing/IP Routing Table
- DNS/DNS Host.

Connecting directly to the Internet

You can connect the system directly to the Internet through a high-speed cable modem or DSL modem. The modem connects to the WAN port (Net 2) on the 3100 ICP controller.

For a static IP configuration, obtain the following destination information from the Internet Service Provider (ISP)

- IP address
- Subnet Mask
- Default ISP Gateway address
- DNS addresses.

For DSL using PPPoE dynamic addressing, obtain the following information

- username
- password.

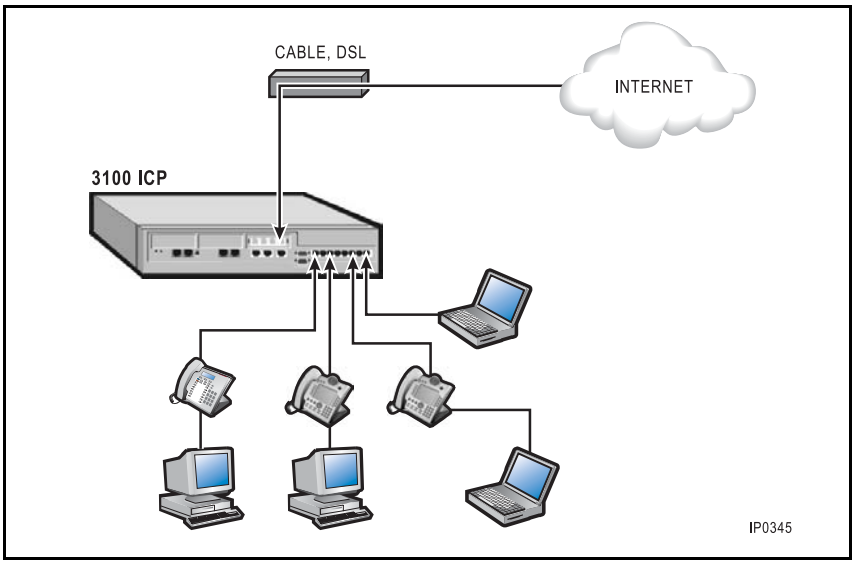


Figure 9: Direct internet connection using WAN port

To connect directly to the Internet through a DSL or cable modem

1. Connect a straight-through CAT 5 cable from the WAN port on the controller to the modem.
2. Launch the system tool. See *Launching the tools (p. 127)*.
3. Choose **IP Networking** from the Selection menu.
4. Click **Router**, click **Network Interface**, click **WAN Ethernet**, and then click **IP Configuration**.
5. Click **Change**.
6. Proceed to one of the following procedures
   - Using Static IP addressing (p. 89)
   - Using Broadband Access (cable modem) (p. 89)
   - Using Broadband Access (PPPoE) (p. 90).

After you select one of the above connection methods, the “IP Address Source” fields in the other two methods are ignored by the system.

Using Static IP addressing

The following procedure is continued from page 88.

7. In the IP Configuration form, choose **Static** from the **IP Address Source** menu.
8. Scroll down to the **Static IP** section.
9. Enter the addresses that you obtained from the ISP
   - IP Address:
   - Subnet Mask:
   - Default Gateway:
10. Click **Save**.
11. To enable NAT on the WAN port (Net 2)
   - Click **NAT** and **NAT General**.
   - Click the IP address of the Net 2 destination at the top of the page.
   - Click **Change**.
   - Check the **Enable NAT** box.
   - Click **Save**.
12. Configure DNS with the ISP DNS addresses. See *Configuring Domain Name Service (p. 101).*
13. Proceed to Commit your changes (p. 91).

Using Broadband Access (cable modem)

The following procedure is continued from page 88.

1. In the IP Configuration form, select **DHCP** from the **IP Address Source** menu.

2. Scroll down the screen to the **DHCP** section.
3. In the Client Name field, enter the **Client Name** (if applicable). Note that some ISPs and DHCP servers do not require you to provide a ClientName or ClientID.
4. Click **Save**.
5. To enable NAT on the WAN port (Net 2)
   - Click **NAT** and **NAT General**.
   - Click the IP address of the Net 2 destination at the top of the page.
   - Click **Change**.
   - Check the **Enable NAT** box.
   - Click **Save**.
6. Proceed to Commit your changes (p. 91).

Using Broadband Access (PPPoE)

The following procedure is continued from page 88.

1. In the IP Configuration form, choose **PPPoE** from the **IP Address Source**.
2. Scroll down the screen to the **PPPoE** section.
3. Under the PPPoE header, enter your **User name** and **Password**. This information is provided by your Internet Service Provider.
4. Enter your **Service Name** and **Access Concentrator**, if applicable.
5. Click **Enable WAN Link**.
6. Click **Save**. The information entered should now be displayed in the WAN Ethernet View.
7. Under **Destinations**, click **Remote** and then click **Remote Destinations**.

8. Select Destination **Net 4**.
9. Click **Change**.
10. Select **Enable Destination**.
11. Click **Save**.
12. Proceed to *Commit your changes (p. 91)*.

Commit your changes

1. Choose **System** from the **Selection** menu.
2. Click **Commit Databases** and then click **Proceed**.

15 sec to 1 min

"Operation Successful" is displayed when the commit database is complete.

3. Launch a browser on any PC that is connected to the system LAN and verify that you can access the Internet.
4. Backup the database. See *Backing up the database (p. 141).*

Connecting to the Internet through an existing LAN

You can connect to the Internet through an existing LAN by using the WAN port or a layer-2 switch (Net 3) port.

Only qualified network engineers should install the 3100 ICP system into an existing LAN.

The 3100 ICP must be physically connected to the existing network with the correct type of cable before you begin either of the following procedures.

Through the WAN port

This configuration allows you to connect the 3100 ICP through the WAN port to a layer-2 switch that is connected to a router that is directly connected to the Internet.

Before you begin this procedure, obtain the following information from the network administrator

- an unused static IP address from the existing LAN subnet for the WAN port
- DNS addresses
- subnet mask
- default gateway IP address (router connected to the internet).

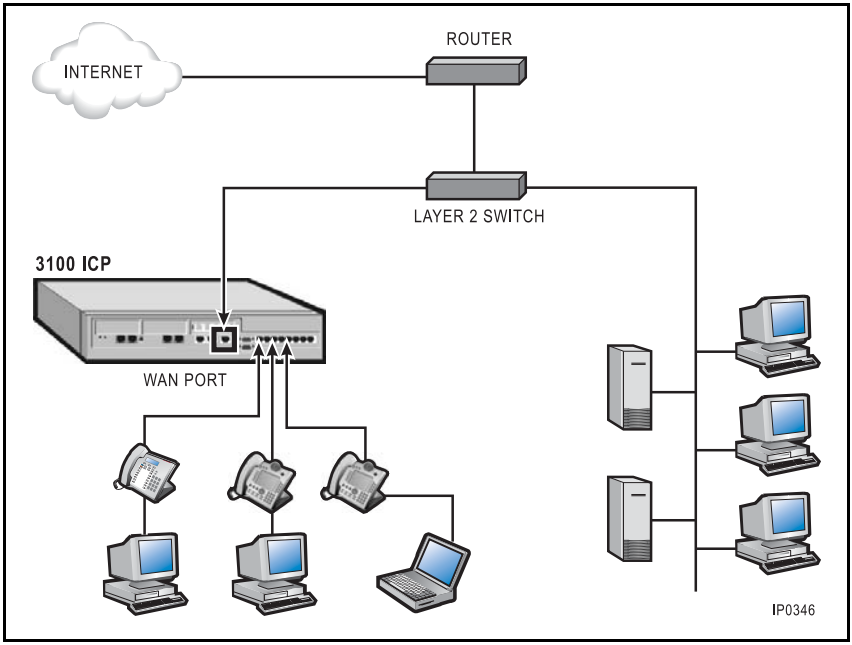


Figure 10: Internet connection through router (WAN port)

1. Connect a cable from the WAN port on the controller to the port on the router or layer-2 switch of the customer's existing LAN.
2. Connect your laptop to a layer-2 switch port on the controller.
3. Launch the system tool. See *Launching the tools (p. 127)*.
4. Choose **IP Networking** from the Selection menu.
5. Click **Router**, click **Network Interface**, click **WAN Ethernet**, and then click **IP Configuration**.
6. Click **Change**.
7. Choose **Static** from the **IP Address Source** menu.
8. Scroll down to the **Static IP** section.

9. Configure the WAN port of the 3100 ICP system with the following static addresses
   - IP Address: Enter the IP address of the 3100 ICP WAN port (enter an unused private IP address that is on the existing LAN subnet)
   - Subnet Mask: Enter subnet mask of 3100 ICP WAN port
   - **Default Gateway Address**: Enter IP address of the router that the system goes through to connect to the internet.
10. Click **Save**.

    The IP Address used for the default gateway will generate a Default Route in the routing table.
11. Configure DNS. See *Configuring Domain Name Service (p. 101)* for instructions.
12. After configuring the DNS server, choose **System** from the **Selection** menu.
13. Click **Commit Databases** and then click **Proceed**.

15 sec to 1 min

    "Operation Successful" is displayed when the commit database is complete.
14. Launch a browser on any PC that is connected to the system LAN and verify that you can access the Internet.
15. Backup the database. See *Backing up the database (p. 141)*.

Through a layer-2 switch port (custom configuration)

This configuration allows you to connect the 3100 ICP through a layer-2 switch port to a router or layer-2 switch that is connected directly to the Internet.

This configuration uses the 3100 ICP as the DHCP server. For instruction on how to use the DHCP services of a remote server, see *Using a remote DHCP server (p. 96)*.

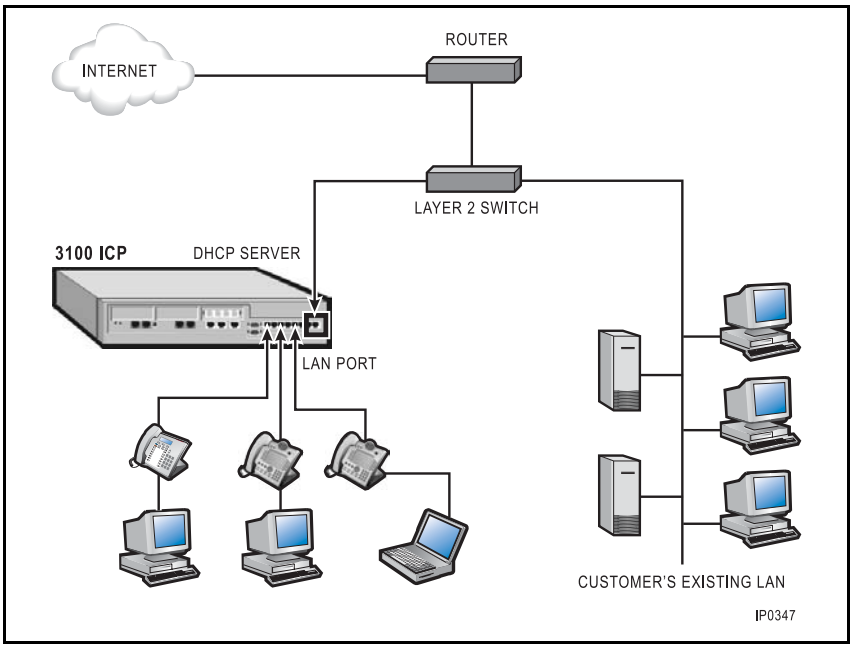


Figure 11: Internet connection through router (layer-2 switch port)

1. Connect a crossover cable from a layer-2 port on the controller to a layer-2 switch port on the customer's LAN.
2. Choose **IP Networking** from the Selection menu.
3. Click **Router**, click **IP Routing**, and then click **Routing Table**.
4. Click **Add**.
5. Enter the following information
   - **IP address:** 0.0.0.0
   - Bit Mask: 0.0.0.0
   - Destination Next Hop Address: Router (gateway) IP address
   - Enter the cost (not normally used)

6. Select the desired Route option (not normally used).
7. Click **Save**.
8. If you are using a DSL/cable router on the layer 2 side of the 3100 ICP controller, you must complete the following programming
   - Click **DHCP**, **DHCP Server**. Click **Change** and then set "Advertise as Default Gateway" to "Not This System". Click **Save**.
   - Click **DHCP**, **DHCP Server**, and then click **DHCP Subnet**. Click **Change** and set "Advertise as Default Gateway" to "Not This System". Click **Save**.
   - Click **DHCP**, **DHCP Server**, and then click **DHCP IP Address Range**. Click **Change** and set "Advertise as Default Gateway" to "Not This System". Click **Save**.
   - Click **DHCP**, **DHCP Server**, and then click **DHCP Options**. Click **Add**. In the ID field, enter 3 (Router Address). In the Format field, select IP Address. In the Value field, enter the address of the DSL/cable router and click **Save**.
9. Commit the database.
10. Launch a browser on any PC that is a DHCP client that is connected to the system LAN. Verify that you can access the Internet.
11. Backup the database. See *Backing up the database (p. 141)*.

Using a remote DHCP server

To configure the 3100 ICP system to use an external DHCP server (for example, Windows NT server or Windows 2000 server) through the layer-2 switch port, you must disable the DHCP server that is built into the

3100 ICP system. The local phones and PCs on the 3100 ICP LAN will then be able to receive IP addresses from the external server.

What you need

- An unused static IP address and subnet mask from your existing LAN, which will become the 3100 ICP system's IP address
- Layer 2-switch connected to the existing DHCP LAN
- CAT 5 (Ethernet) crossover cable to connect a laptop

Configuring the 3100 ICP

1. Connect a laptop PC to the WAN port (Net 2) with the crossover cable.
2. Launch the system tool. See *Launching the tools (p. 127).*
3. Choose **IP Networking** from the Selection menu.
4. Click **DHCP**, click **DHCP Server**, and then click **DHCP Server**.
5. Click **Change**. In the DHCP Server field, choose **Disable**.
6. From the Advertise as Default Gateway menu, choose **Not this system**.
7. Click **Save**.
8. Click **Router**, click **Network Interface**, click **Net IP** and then select the IP address of the layer-2 switch port (Net 3) destination at the top of the right page.
9. Click **Change**.
10. Complete the following

    Destination: Net 3

IP Address source: Static

IP Address: (enter the static IP address)

Bitmask: (enter the Subnet Mask)

11. Click **Save**

If you connected your laptop PC to a layer-2 switch port (Net 3), after you save your database you will lose your connection to the network. You will need to reconnect with the new static IP addresses.

12. Commit the database.

13. Add the following DHCP options to the external DHCP server:

ID: 6
Name: DNS Server
Format: IP Address
Value: Enter the static IP address assigned to the 3100 ICP (Net 3) or the IP address of an existing DNS server
Scope: Global

ID: 128
Name: TFTP Server
Format: IP Address
Value: Enter the static IP address assigned to the 3100 ICP (Net 3)
Scope: Global

ID: 129
Name: (IP PHONE SERVICE PROVIDER)
Format: IP Address
Value: Enter the static IP address assigned to the 3100 ICP (Net 3)
Scope: Global

ID: 130
Name: MITEL IP PHONE (must be all uppercase)
Format: ASCII String
Value: MITEL IP PHONE (must be all uppercase)
Scope: Global or select the subnet IP address range

Changing the assigned DHCP IP address range

Use this procedure to program the layer-2 switch (NET 3) of the 3100 ICP system to support a different DHCP IP address range. This procedure changes the default layer-2 switch IP address (192.168.1.2) to match the customer's required LAN subnet addressing. In this example, the phones and PC's use the DHCP service on the 3100 ICP system and all devices are plugged into the 3100 ICP system.

The programming must be performed through the WAN port through a CAT 5 crossover cable.

Configure the IP address of the NET 3 destination

1. Launch the system tool. *Launching the tools (p. 127)*.
2. Choose **IP Networking** from the Selection menu.
3. Click **Router**, click **Network Interface**, and then click **Net IP**.
4. Click **Net 3** in the right pane.
5. Click **Change.**
6. For the IP Address source, select **Static** and enter a valid unused IP address and subnet mask from the existing LAN subnet.
7. Click **Save**.

Add the DHCP Server entries to match the customer's LAN subnet addressing

1. Click **DHCP**, **DHCP Server**, **DHCP Subnet**, delete the existing subnet, and then click **Add**.
2. Add the Name, IP address, and Bit Mask to fit your existing LAN subnet.

3. Ensure that the Advertise as Default Gateway field is set to **This System First**.

4. Click **Save**.

Add the DHCP IP Address range

1. Click **DHCP IP Address Range**.

2. Delete the existing range.

3. Click **Add**.

4. Enter a name for the IP Range.

5. Enter valid Start and End addresses of the IP range (Up to 200 leases are allowed in the address range of 192.168.1.10 to 192.168.1.209).

6. Leave the other parameters at the defaults and then click **Save**.

Change the DHCP Options

1. Click **DHCP Options** in the DHCP Server folder.

2. Select **ID #6 DNS Server** from the list of options.

3. Click **Change**.

4. Change the Value setting to the new IP address that was configured on NET 3 (from the procedure on page 99).

5. Click **Save**.

6. Repeat the above steps to change the DHCP options of **ID #128** and **ID #129** for the IP phones.

Configure the DNS Server

1. Configure the DNS server. See *Configuring Domain Name Service (p. 101)*.

2. Commit the database.

15 sec to 1 min

“Operation Successful” is displayed when the commit database is complete.

3. Connect a crossover cable from a layer-2 switch port on the controller to the existing LAN.

4. Launch a DOS command window and ensure that you can ping computers that are located on the existing LAN. Ping the IP addresses on your network and check external name resolution by navigating to external websites.

   You must set the laptop PC to use the 3100 ICP system as its DNS server.

5. Open a browser and ensure that you can surf to a site on the Internet. If you are unable to access the internet, your DNS settings for the 3100 ICP system are probably incorrect. See *Configuring Domain Name Service (p. 101)*.

Configuring Domain Name Service

The 3100 ICP controller includes a Domain Name Service (DNS). You should configure this service to help users resolve local and remote web queries.

Users will not be able to browse the Internet unless you have configured DNS to forward user’s requests to the DNS sever of the Internet Service Provider (ISP).

1. Launch the system tool. See *Launching the tools (p. 127).*

2. Choose **IP Networking** from the Selection menu.

3. Click **DNS**, click **DNS Server**, and then click **Change**.

4. Enter the following information.
   - **Domain Name:** Local (or your Domain Name if applicable)
   - **Primary DNS IP Address:** Enter the address of your ISPs DNS server
   - **Secondary DNS IP Address:** Enter the Secondary address of your ISPs DNS server. If unavailable, enter Primary again
   - **Group Query Order:** Local First
   - **Accept DNS from Remote PPP:** Enable
5. Click **Save**.

Next, add the static IP addresses and host names of routers, gateways (and any other devices on the LAN that have fixed IP addresses) to the DNS Host form.

1. Click **DNS** and then click **DNS Host**.
2. Click **Add**.
3. Enter the Host Name and IP Address of the first computer on the LAN and click **Save**.
4. Repeat step 2 and step 3 for each computer on the LAN.
5. Choose **System** from the **Selection** menu.
6. Click **Commit Databases** and then click **Proceed**.

15 sec to 1 min

"Operation Successful" is displayed when the commit database is complete.

Assigning a gateway

Most configurations have either a gateway server or a DSL router. You can set up the 3100 ICP system to direct all traffic bound for the Internet through a gateway server or through a router instead of going through the system's WAN port.

If your router or firewall is positioned between your DSL modem and the 3100 system, connect the system to the Internet through a layer-2 switch port (see Figure 11 (page 95)).

OR

Use the WAN port to connect the system directly to the Internet through a DSL modem (see Figure 9 (page 88)).

To assign a gateway server

1. Launch the system tool.
2. Choose **IP Networking** from the Selection menu.
3. Click **Router**, click **IP Routing**, click **Routing Table**, and then click **Add**.
4. Enter the following:
   - **IP Address:** (leave as 000.000.000.000)
   - **Bit Mask Destination:** 0.0.0.0
   - **Next Hop Address:** The Next Hop Address is the IP address of your DSL router or local server that is connected to the controller.
   - **Cost:** Enter the cost.
   - **Route Options:** Do not enable these options unless your network setup requires them. Refer to the System Tool online help for additional information.
5. Click **Save**.
6. Click **DNS**, click **DNS Server** and then click **Change**.

7. Enter the following:
   - **Domain Name:** Local (or your domain name, if applicable)
   - **Primary DNS IP Address:** (enter the IP address of your ISP's primary server or your own DNS Server IP address if you have one on your network)
   - Leave the other fields at their defaults.
8. Click **Save**.
9. Commit your changes.

Programming dial-up access to an ISP

To connect a modem to an ISP

1. Launch the system tool.
2. Choose **IP Networking** from the Selection menu.
3. Click **Router**, click **Destinations**, click **Remote**, click **Remote Destinations** and then select an available destination (from Net 5 to Net 13).
4. Click **Change** and change the destination name to ISP_LINK (case-sensitive).
5. Click **Save**.
6. Click **Remote Connection** and then click **Add**.
7. Add a new entry for destination ISP_LINK. Set the **Call Type** to outgoing, set **Connect Using** to modem, and enter your dial string. Enable the link.
8. Click **Save**.
9. Click **PPP Configuration** and then click **Add**.

10. Add a new entry for the destination ISP_LINK.
    - Set Protocol to “none”.
    - Fill in your Local Name and Local Secret name. These names are your username and password, respectively, that you received from your ISP.
    - For Compression, select either “none” or “STAC” (STAC Compression may not always work. If it does become an issue disable it from the remote client) for compression.
    - In the Connect As section, select “client” for the mode, select “accept IP from remote”.
11. Click **Save**.
12. Click **Destinations**, click **Remote**, click **Remote Destinations**, select the ISP_LINK destination, and then click **Change**.
13. Click **Enable Destination** and then click **Save**.
14. Notice that a default route entry will show up in the routing table (via NextHop 10.122.122.122). When stimulus is received and is forwarded through the default route, either through a browse action or a ping, the ISP will be dialed and a connection will be established. Once the connection is established, the IP address of the interface and entries in the routing table will automatically be updated with the info learned from the ISP. NAT will automatically be added to the interface and is enabled.

You cannot use the special destination ISP_LINK and the DSL (Net4) at the same time.

Configuring NAT Redirect

Network Address Translation (NAT) is an Internet standard that enables a Local Area Network (LAN) to use one set of IP addresses for internal traffic, and a second set of addresses for external traffic. A NAT device located where the LAN meets the Internet makes all the necessary IP translations

Enabling NAT Redirect on the 3100 system allows external clients to access services that are running on the internal LAN (behind the NAT interface). The NAT Redirect feature listens for requests on the 3100 system's external Net 2 IP address (WAN port) and then forwards the requests to a defined Net 3 IP address (Layer -2 switch port) where the requested service is available and then forwards back the reply to the requesting client.

Figure 12 (page 107) provides an example of how NAT could be used to redirect data traffic to servers on the LAN. Note that the addresses are examples only.

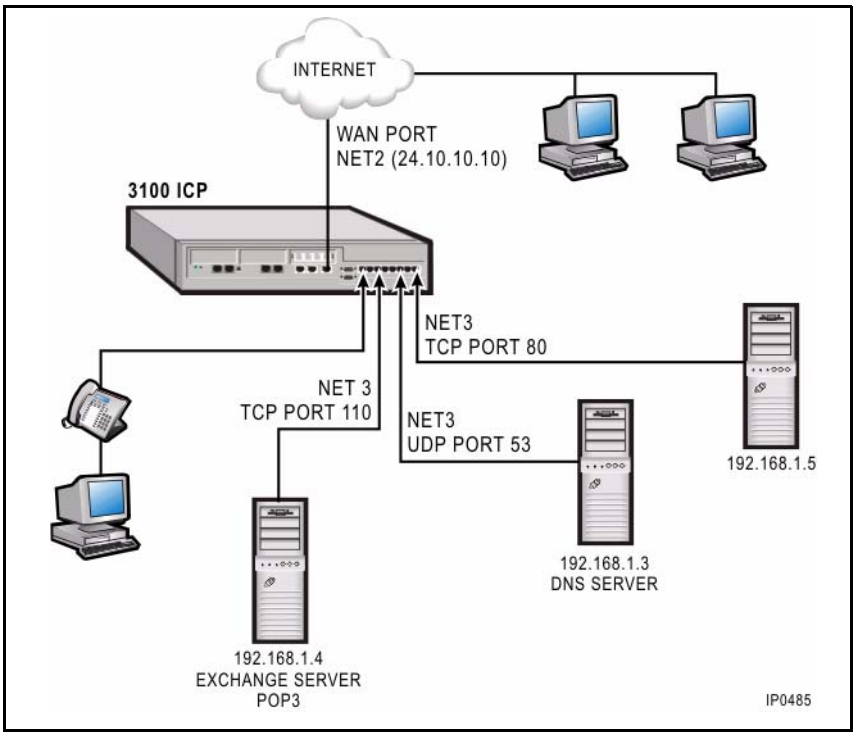


Figure 12: Example of NAT redirect

To configure NAT redirect for the example shown in Figure 12 (page 107)

1. Choose **IP Networking** from the Selection menu.
2. Click **Router**, click **NAT**, and then click **NAT General**.
3. Click the **Net 2** destination and then click **Change**.
4. Click **Enable NAT** and then click **Save**.
5. Click **NAT Redirect** and then click **Add**.

6. Select **Net 2**, click **TCP**, and complete the following
   - **From Port:** 80
   - **To IP:** enter the IP address of the http server (example 192.168.1.5)
   - **To Port:** 80
7. Click **Save**.
8. Click **Add**.
9. Select **Net 2**, click **UDP**, and complete the following
   - **From Port:** 53
   - **To IP:** enter the IP address of the DNS server (example 192.168.1.3)
   - **To Port:** 53
10. Click **Save**.
11. Click **Add**.
12. Select **Net 2**, click **TCP**, and complete the following
    - **From Port:** 110
    - **To IP:** enter the IP address of the POP3 email server (example 192.168.1.4)
    - **To Port:** 110
13. Click **Save**.

Restricting LAN access (firewall)

You can use Mitel Networks 6000 Managed Application Server (MAS) or the SonicWALL™ SOHO2 Internet security appliance to create a secure barrier (firewall) between the 3100 ICP local network and the public Internet. A firewall keeps a network secure from external intruders.

This section provides instructions on how to

- connect the 6000 MAS to a layer-2 switch port on the 3100 ICP system (recommended setup)
- connect the 6000 MAS to the WAN port on the 3100 ICP system
- connect the SonicWall SOHO2 to a layer-2 switch port on the 3100 ICP system

You can also use other firewall products, if desired; they would be configured in a similar manner.

Connecting the 6000 MAS to the layer-2 switch port

This configuration uses a port on the 3100 ICP system. All 6000 MAS services are supported.

Configuring the 6000 MAS for connection to a layer-2 switch port

1. Connect the 6000 MAS to the 3100 ICP as show in the following diagram.

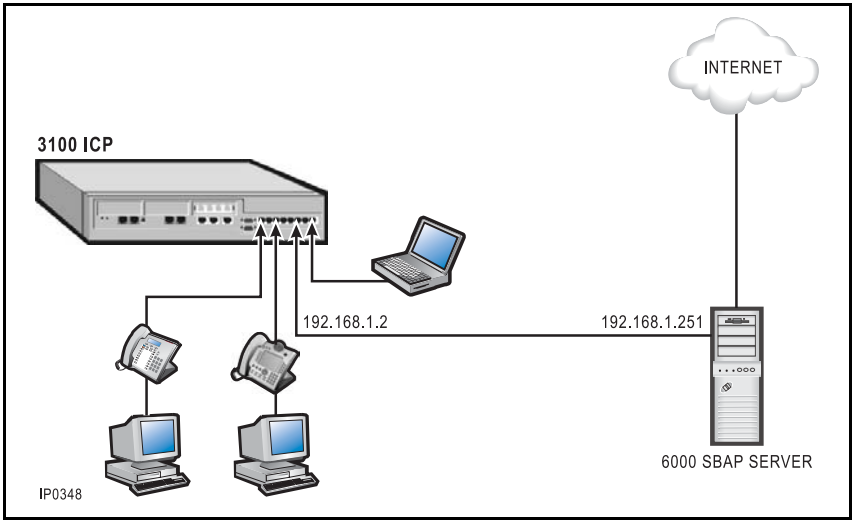


Figure 13: Connecting the 6000 MAS to layer-2 switch port

2. When you install the 6000 MAS, set the console settings in the following order:

   Primary domain name: (choose a domain)
   System name: mitel6000

   Local network ethernet adapter: (choose a device)
   Local IP address: 192.168.1.251
   Local subnet mask: 255.255.255.0
   Operation mode: server and gateway
   External access mode: (choose an access mode)
   Ethernet network ethernet adapter: (choose the other device)
   External interface configuration: (obtain from ISP)
   DHCP Server configuration: ON
   Master DNS server: (leave blank)
   Proxy server: No

3. After installing the 6000 MAS, log in to the server manager from your browser at the following URL: http://192.168.1.251/server-manager

4. Enter your username and password
   User: admin
   Password: (as set during installation)
5. In the Workgroup pane, set “Workgroup and Domain Controller to “Yes”
6. From the “Servicelink -> Status” panel, enter the Service Account and click **Register**.
7. From the “Administration ->Blades” panel, install the “IP-Phone-Support” blade.
8. Refresh the browser window to display the “Administration ->IP phone” support panel.
9. Open the “Administration->IP phone” page and then set “IP phone support for 3100” to “enabled” and then click **Save**.
10. Next configure the 3100 ICP.

Configure the 3100 ICP

1. Launch the system tool.
2. Choose **IP Networking** from the Selection menu.
3. Click **Router**, click **IP Routing**, click **Routing Table**, and click then **Add**.
4. In the IP Address field, enter the default route address of 0.0.0.0
5. Enter a Bit Mask of 0.0.0.0
6. In Next Hop, enter the 6000 MAS local IP (192.168.1.251).
7. Leave the other parameters unchanged and click **Save**.
8. Click **DHCP**, click **DHCP Server**, and then click **DHCP Server**.
9. Click **Change** and set **DHCP Server** to “disable”. The 6000 MAS server performs DHCP function.
10. Click **Save**.

Connecting the 6000 MAS to the WAN port

This configuration is not recommended. Although this configuration does not use up a layer-2 switch port, it prevents some of the 6000 MAS services from functioning correctly and also impacts the network throughput because the 3100 ICP system will perform Network Address Translation (NAT) on all outbound data traffic.

Install the 6000 MAS

Refer to 6000 MAS technical documentation for instructions.

Configuring the 6000 MAS for connection to WAN port

1. Connect the 6000 SBAP to the 3100 ICP as show in the following diagram.

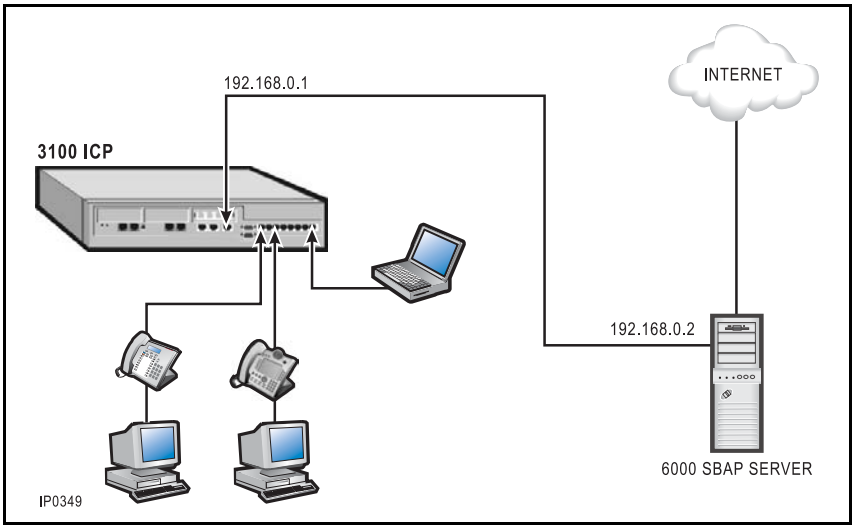


Figure 14: Connecting the 6000 MAS to WAN port

2. When you install the 6000 MAS, set the console settings in the following order:

Primary domain name: (enter your domain name if you have one or leave it as the default, MYCOMPANY.xxx)
System name: mitel6000
Local network ethernet driver: (choose your device)
Local IP address: 192.168.0.2
Local subnet mask: 255.255.255.0
Operation mode: server and gateway
External access mode: (choose an access mode)
External network ethernet driver: (choose the other device)
External interface configuration: (obtain from ISP)
DHCP server configuration: Off
Master DNS server: (leave blank)
Proxy server: No

3. After installing the 6000 MAS, log in to the server manager from your browser at the following URL: http://192.168.0.2/server-manager

4. Enter your username and password
   User: admin
   Password: (as set during installation)

5. In the Workgroup panel, set “Workgroup and Domain Controller to “Yes”

6. From the “Servicelink -> Status” panel, enter the Service Account and click **Register**.

7. From the “Administration ->Blades” panel, install the “IP-Phone-Support” blade.

8. Refresh the browser window to display the “Administration ->IP phone” support” panel.

9. Open the “Administration->IP phone support” page and then set “IP phone support for 3100” to “enabled”. Enter 192.168.1.2 as the “IP Address of the ICP” and then click **Save**.

10. In the “Local Networks” panel, add the following new local network:
    Network Address: 192.168.1.0

Subnet Mask: 255.255.255.0
Router: 192.168.0.1

11. Next, configure the 3100 ICP.

Appletalk filesharing will not work between the 6000 MAS and computers that are connected to the 3100 ICP system. The ServiceLink IPSEC VPN service for server-to-server connections will not work with this configuration. Client-to-server VPN connections that use PPTP will, however, operate normally.

Configure the 3100 ICP

1. Launch the system tool.
2. Choose **IP Networking** from the Selection menu.
3. Click **Router**, click **IP Routing**, click **Routing Table**, and then click **Add**.
4. In the IP Address field, enter the default route address of 0.0.0.0
5. Enter a Bit Mask of 0.0.0.0
6. In Next Hop, enter the 6000 MAS local IP (192.168.0.2).
7. Leave the other parameters unchanged and click **Save**.

SonicWALL SOHO2

The following instructions refer to the SonicWALL SOHO2 Internet security appliance only.

Install the SonicWALL SOHO2

Refer to SonicWALL technical documentation for instructions.

Configure the SonicWall SOHO2

1. Setup and configure your DSL modem.
2. Connect the DSL line to the WAN port on SonicWall SOHO2.
3. Configure your PC to use IP address 192.168.168.2, Subnet 255.255.255.0, and Gateway 192.168.168.168.
4. Connect the PC to the LAN port on the SonicWall SOHO2, using either a CAT 5 crossover cable or via a hub or switch.
5. Start Internet Explorer 5.5 and go to the following address 192.168.168.168.
6. If necessary, download new firmware to SonicWall SOHO2 and wait for it to restart. Exit the browser window and start up a new browser and go to address 192.168.168.168 again.
7. The SonicWall configuration wizard should start automatically. Click **Next**.
8. If desired, change the password and click **Next**.
9. Set the correct Time zone and click **Next**.
10. Click **Next**.
11. Enter the Name and Password supplied by your ISP. Click **Next**.
12. Leave the default IP Address and Netmask on this screen (should be 192.168.168.1/255.255.255.0.) Click **Next**.
13. Ensure that DHCP server is disabled. Click **Next**.
14. Click **Next**.
15. Click **Restart**.

16. Close all browser windows.
17. Start a new browser and browse to the SonicWall console at address 192.168.168.1
18. Login to the console.
19. Click the **Advanced** button on the left side of the screen.
20. Click the **Routes** tab near the top of the screen.
21. Click in the Dest Network field in **Add Route**.
22. Enter address 192.168.1.0 (3100 ICP LAN network).
23. Tab to the Subnet Mask field and enter 255.255.255.0
24. Tab to the Gateway field and enter 192.168.168.2 (address of the 3100 ICP WAN Ethernet interface).
25. Click **Update** at bottom of window.
26. Restart the SonicWall SOHO2 appliance.
27. Close all browser windows.

Configure the 3100 ICP system with the SonicWALL SOHO2

1. Configure the monitoring computer's network settings to **Get Address** automatically. Then in the DHCP Client, add the DNS addresses that were supplied by your ISP.
2. Connect the computer to a 3100 ICP LAN port. It may be necessary to open an MS-DOS command window and type the command **ipconfig /renew**.
3. Initiate the Internet Explorer browser and click on the **Stop** button to prevent it from automatically connecting to the default web site.

4. Launch the system tool. See *Launching the tools (p. 127)*.

5. Choose **IP Networking** from the Selection menu. Click **Router**, click **Network Interface**, and then click **Net IP**.

6. Click the IP address of the Net 2 interface and then click **Change**.

7. Change the IP Address to **192.168.168.2**.

8. Click **Save**.

9. Click **WAN Ethernet** and then click **IP Configuration**.

10. Ensure that the IP Address Source is set to **Static** and the Bitmask is defined as **255.255.255.0** and the IP address is **192.168.168.2**.

11. Click **Save**.

12. Click **Router**, click **IP Routing**, click **Routing Table** and then click **Add**.

13. In the IP Routing Table dialog box, change the Next Hop Address field to **192.168.168.1** (the address of the SonicWALL firewall). The IP address and Bit Mask must be set to **0.0.0.0**.

14. Click **Save**.

15. In the IP Networking folder, click **DNS**, click **DNS Server** and then click **Change**.

16. Enter the Primary and Secondary DNS Server IP addresses provided by your ISP.

17. Click **Save**.

18. Exit and commit your changes.

Setting up a mail server behind the SonicWALL SOHO2

For security, you should connect a firewall between the Internet and your internal network.

This procedure provides instructions on how to configure a SonicWall firewall to allow e-mail to reach your internal mail server.

The SonicWall Firewall must have firmware version 6.3.1.0 or later

1. Login to the SonicWall firewall application and click the **Access** button on the left side of the screen.

   The Network Access Rules (By Service) window appears.

2. Select the desired type of mail service.

3. In the Public LAN Server field, enter the IP address of your mail server.

If the mail service you require is not available in the Network Access Rules (By Service) window:

1. Click **Add Service** at the top of the screen.

2. From the **Add a Known Service** drop-down menu, select the required protocol and then click **Add**.

3. Click **Rules** and then click **Add New Rule . . .**

   The Add Network Access Rule window appears.

4. In the Action field, click **Allow** and then select the required service from the Service drop-down menu. Leave the Source field at the default.

5. In the Destination field, select **LAN** and then enter the IP address of the mail server in the Beginning and End fields.

6. Click **Update**. Your mail services are ready to receive mail from the internet.

By default the 3100 ICP system allows outgoing emails.

IP networking tips

- The WAN Link Idle timeout is set to 5 minutes. You change this setting through the system tool in the Idle Disconnect field in the Remote Destinations form.
- For IP phones, you must configure the following options:

  Option 6 -- DNS Server (192.168.1.2)
  Option 128 -- TFTP Server (192.168.1.2)
  Option 129 -- IP Phone Service Provider Address (192.168.1.2)
  Option 130 -- IP Phone Identifier option (MITEL IP PHONE)

- By default, the DHCP sever's dynamic IP range for the LAN devices is 192.168.1.10 to 192.168.1.250. The DHCP server, distributes addresses on a first come, first server basis starting with 192.168.1.10. If there are other devices on the LAN that configured with static IP addresses, ensure that these addresses do not overlap the dynamic range.

Chapter 5
Routine maintenance

Is the system healthy?

System health checklist

- ☑ Light indicators on controller and expansion units are correct color
- ☑ You can make internal and external calls from IP phones and ONS sets as required
- ☑ Internet access is available to PC users on the 3100 ICP system LAN
- ☑ Voice mailboxes are accessible
- ☑ Users have URL, usernames, and passcodes to the desktop tool
- ☑ Set users have user guides and quick reference cards
- ☑ Remote system access is set up
- ☑ 5140 IP Phones online services are set up
- ☑ Database is backed up
- ☑ Voice mail data is backed up.

Is the system secure?

- ☑ Firewall is installed (6000 MAS or SonicWALL recommended)
- ☑ Passwords and usernames for tools have been changed
- ☑ Passwords and usernames are recorded and stored securely
- ☑ Call logging records have been checked for irregularities
- ☑ Toll restriction and classes of service are set up correctly
- ☑ Toll restriction matrix is set up to prevent unauthorized routing and line to line transfers
- ☑ Account codes are programmed
- ☑ Voice mailboxes are set up to prevent access to external lines
- ☑ Secure Telnet using Open Secure Socket Layer protocol (SSL)
- ☑ Call forwarding is secure.

Checking the system

1. Check the controller and expansion units. Ensure all Light Emitting Diodes (LEDs) are displaying correctly. See *Checking the system LEDs (p. 155)*.

2. Make internal and external calls from the IP phones and analog sets.

3. Call into the system on all line types and ensure that incoming calls ring the required auto attendant, attendant extension, or extension group.

4. Log on to a PC on the network and ensure that you can access the Internet.

5. Ensure that you can log into the system, group administration and desktop tools.

6. Review voice mail programming. Ensure that incoming callers cannot access an external line through voice mail. In the System tool, choose **Voice**, click **Voicemail**, click **System Settings**, and then click **Voicemail Options**. Set the “Restrict #’s that Begin with” field to include the outgoing line access digits (default 9).

7. Ensure the external call forwarding permissions are set correctly. In the **System** tool, choose **Voice**, click **Extensions**, and then click Remote Call Forward.

8. Ensure that users have the URL, username and passcode to the desktop user tool. Send each user an e-mail with this information. Note that the desktop user tool is not available for 5001 and 5201 IP phones.

   Users access the desktop tool by launching the login page, entering their username (defaults to their extension number), and their passcode (defaults to their extension number).

9. Ensure that Toll Restriction, Restriction Groups, Class of Service, and Toll Restriction Matrix settings are set correctly. See *Program the digital trunks (p. 58)*.

10. Ensure that end users have user guides. See *Creating a user guide (p. 149)*.

11. Ensure that remote system access is set up if you plan to perform remote programming. See *Using a remote access session (p. 144)*.

12. Ensure that you have made recent backups. See *Performing backups (p. 141).*

13. Ensure that a firewall is in place to protect the network from intruders. See *Restricting LAN access (firewall) (p. 109).*

Launching the tools

You can connect a PC or laptop to the 3100 ICP system through

- a LAN drop
- the Ethernet port on the back of the IP Phone
- directly to a layer-2 switch port on the Mitel Networks 3100 ICP controller or expansion unit.

You must configure the PC to accept an IP address from the 3100 ICP system. See *Configuring the PC (p. 29).*

You can also access the 3100 ICP system remotely by dialing into the Mitel Networks 3100 ICP system through a trunk (using the installed V.90 modem) or through the Internet. See *Using a remote access session (p. 144)* for more details.

To launch a tool

1. Launch your browser and go to the following URL:
   http://192.168.1.2

2. Enter your username and password
   Login: **system** (default)
   Password: **mnet** (default)

3. Click
   - Group Administration Tool
   - System Tool, or
   - System Quick Installation Tool

4. Proceed to *Programming the voice parameters (p. 54)*.

You can only have one system tool session or one Telnet tool session open at any time. The system quick installation tool is only used during the initial configuration of the system.

Enabling your licensed options

Your Mitel Options System Selection (MOSS) passcode determines your licensed system options. It corresponds to a unique System Identification (SYSID) code that is assigned to your system. You must enter your MOSS option code into the system to enable purchased options.

Obtain your MOSS option code

1. Launch your browser and go to the following URL: **www.mitel.com**
2. Access Mitel Online from the Online Services selection menu.

   You require a username and password to access Mitel Online.
3. Click **Sales Tools** or **Technical Support**, and then click **Mitel Networks ICP Password Inquiry**.
4. Click **Mitel Networks 3100 ICP Password Inquiry** and then accept the terms and conditions.
5. Click **View Password for Specific ID**.
6. Enter your 12-digit SYSID code. Your SYSID code is printed on a label that is affixed to the back of the controller underneath the serial number.
7. The service displays your MOSS option code.
8. Click the SYSID code to view the options and licenses you have purchased.
9. Record or print the information.

Enable your options

1. Launch the system tool. See *Launching the tools (p. 127)*.
2. Choose **System** from the Selection menu.
3. Click **License** and then click **Change**.
4. Enter your licensed options and license passcode (MOSS code).
5. Click **Save**. Your system is updated with the new options.
6. Commit the database.

You must reboot 3100 ICP to enable new voice mail licenses.

Rebooting the system

You perform a reboot

- after upgrading the system software
- after applying a software patch
- after installing voice mail software
- after changing languages
- after programming digital lines (including programming changes to existing digital lines)
- if the system is not functioning

The following procedure takes the system out of service for approximately 15 minutes. While the system is rebooting, the data network will not be available and all calls in progress will be terminated. Perform reboots during off hours.

Never disconnect the power while the system is booting.

Do not leave the RS-232 diagnostics cable disconnected from the computer or laptop COM port during system bootup (that is, either connect the cable to the PC or disconnect it from the diagnostics port).

To reboot the system

1. Launch the system tool. See *Launching the tools (p. 127)*.
2. Choose **System** from the Selection menu
3. Click **Reboot 3100**.

8 min

4. Read the instructions and then click **Proceed**.

Powering down the system

Do not disconnect the system power if the LED is flashing red and amber.

1. Ensure that you have current backups. See *Performing backups (p. 141)*.
2. Ensure that there are no database backups or restores in progress.
3. Ensure that the Power LED on the controller front panel is steady green.
4. Straighten out a paper clip.
5. Using the paper clip, press and release the CONFIG button.

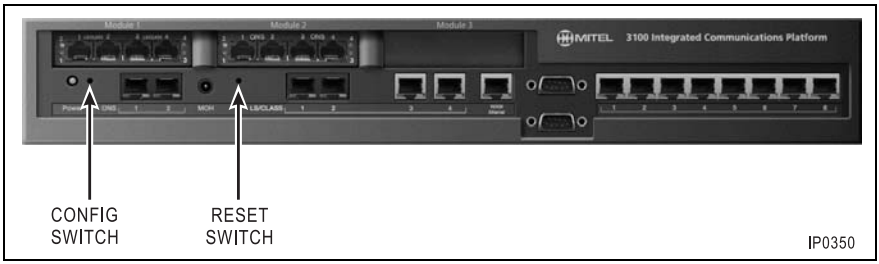


Figure 15: CONFIG and RESET switches

6. The Power LED flashes red for 30 seconds and is then lit steady red.
7. After the Power LED is steady red, unplug the system power cord from the power supply.
8. Disconnect the power cord from the power bar.

Powering up the system

1. Connect the power cord to the rear panel of the controller unit and plug the power cord into a power bar.
2. Connect the power bar to a power outlet.
3. Check the Power LED. During the power up sequence the Power LED will display the following states:
   - initially flashes red
   - flashes green/off while the system is booting
   - steady amber while running startup diagnostics
   - flashes amber while running bootrom VxWorks
   - steady green when bootup is complete.

Never disconnect the system power if the LED is flashing red and amber.

Do not leave the RS-232 diagnostics cable disconnected from the computer or laptop COM port during system bootup (that is, either connect the cable to the PC or disconnect it from the diagnostics port).

Upgrading the system

Installing option modules

1. Power down the controller and disconnect all connections to the public telecommunications network.
2. Attach an anti-static strap.
3. Remove the top cover.
4. Locate the option module slots (see Figure 5 (page 23)). Remove the four screws from the standoffs. The locations of the screws are shown in Figure 16 (page 133).

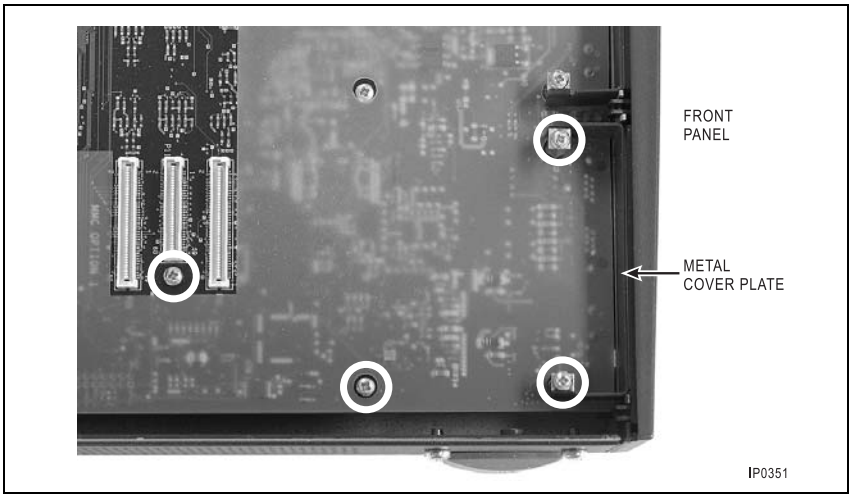


Figure 16: Removing the screws

5. Insert the two standoffs supplied with the options module.

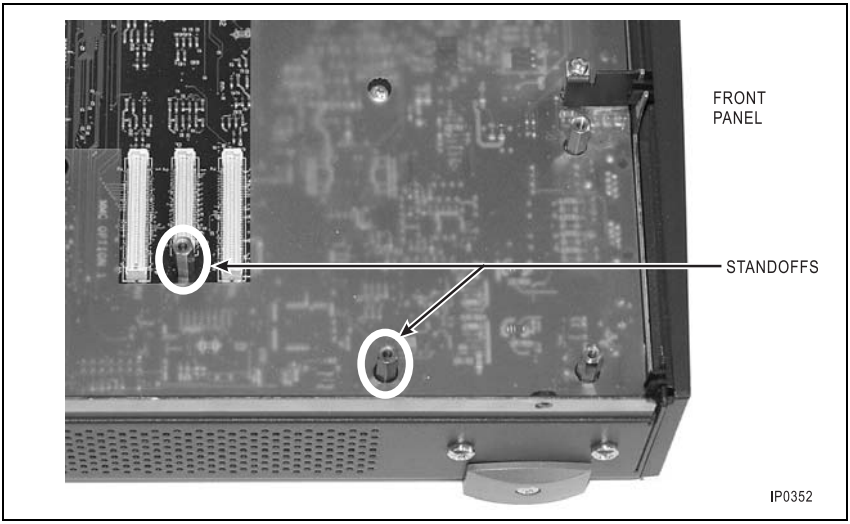


Figure 17: Inserting the standoffs (option module 1)

6. Secure the options module with the four screws.
7. Replace the metal plate and top cover.
8. Connect the lines or phones and power up the system. If you are installing a T1/E1 module, connect the incoming digital line to the T1/E1 port. Connect the LAN port to a Layer 2 switch port on the controller with the supplied CAT 5 cable.
   - Instructions for programming additional lines are provided in the section *Programming the voice parameters (p. 54)*.
   - To program new sets, see *Modify the extensions and system directory (p. 54).*

Adding expansion units

You can add up to two expansion units to the system.

A single expansion unit is shipped with an uplink card, an uplink cable, and a Y-ac power cable.

To add two expansion units, you require a dual uplink card kit. The kit includes a dual uplink card, and the uplink cables and power cables required to connect two expansion units (see Figure 19 (page 137)).

If you are upgrading the system with a 24-port expansion unit, you must first upgrade the system to Release 4.0 version software or higher. See *Upgrading the system (p. 133)*. After upgrading the system software, power down the system, connect the new hardware, and reboot the system.

1. Power down the controller and disconnect all connections to the public telecommunications network.
2. Attach an anti-static strap.
3. Remove the top cover of the controller.
4. Install the Uplink card or Dual Uplink card (see Figure 18 (page 136)) on the two standoffs.
5. Secure the card with the supplied screws.

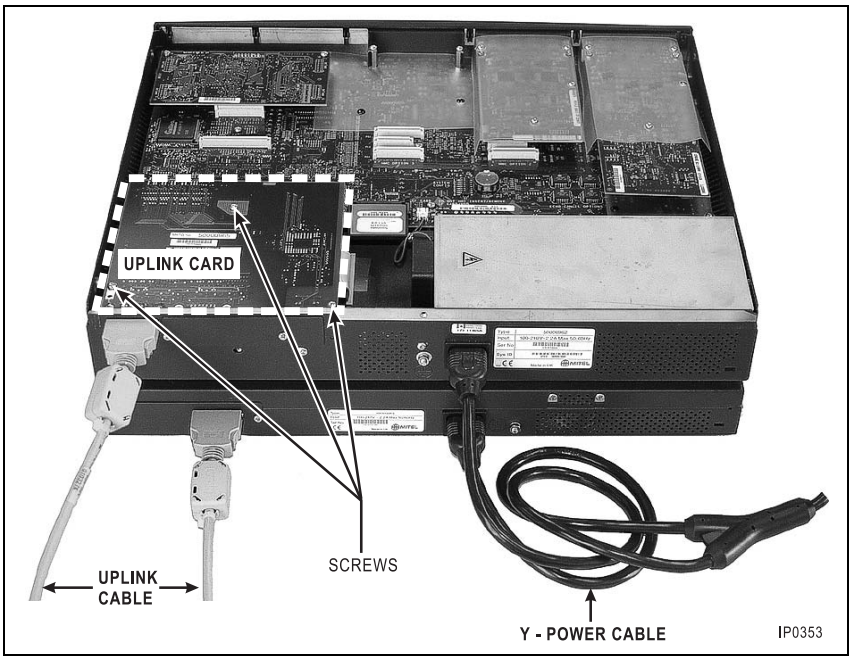


Figure 18: Installing a single expansion unit

6. Connect the uplink cables and Y-ac power cords from the controller to the expansion unit(s). If you are connecting a single expansion unit, refer to Figure 18 (page 136); if connecting two expansion units, refer to Figure 19 (page 137).

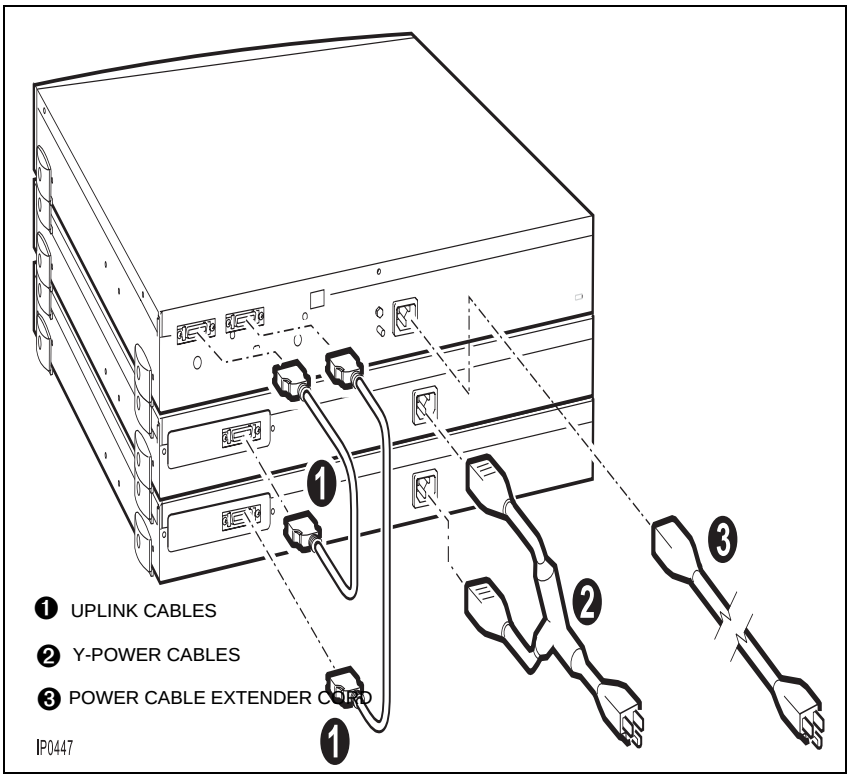


Figure 19: Connecting two expansion units

7. Power up the system.

Performing a software upgrade

You perform a software upgrade to install a new software load. Software upgrades are distributed either on a software CD-ROM or you can download them from the Mitel Online website.

Not all software upgrades require a voice mail software upgrade. Read the Field Change Instruction (FCI) document first. ONLY upgrade voice mail software when required.

If a software upgrade fails, you can restore the previous software version and database (N-1 version) that is stored on the system hard drive. See *Restoring the system with the factory software (p. 182)*.

The following procedure takes the system out of service for approximately 45 minutes.

To perform a software upgrade

1. Perform backups (including a full voice mail backup). If a backup fails, try it again. If it fails a second time, contact Technical Support before proceeding with the upgrade.
2. Ensure that you have the MOSS option passcode for your licensed options.
3. If you use your own .wav file for music on hold, ensure that you have a backup of the file. After an upgrade, your file will be overwritten by the default music on hold file.
4. Insert the upgrade software CD-ROM in your PC.
   or
   Download the software upgrade file (.maz) from Mitel Online to a PC that is on the 3100 ICP system LAN.
5. Launch the system tool on the PC.
6. Choose **System** from the Selection menu.
7. Click **System** and then click **Upgrade Software**.
8. Read the instructions and then click **Proceed**.
9. Click **Browse** and navigate to the upgrade file (.maz) on the CD-ROM or PC.
10. Select the file and click **Open**.
11. Click **Upgrade**. The upgrade file is transferred to the system. Note that the system is functional while the file is being transferred.

Do not power down the 3100 ICP system during an upgrade.

30 min

12. When “Operation Successful” appears, click **Reboot the 3100 ICP.**

45 min

13. After you click **Reboot the 3100 ICP**, the power indicator turns red for about 30 seconds.

14. Close the existing system login page and launch a new one after the system has rebooted.

15. If you use your own music on hold file, restore it by using the system tool (System -> Replace Music on Hold).

16. Backup the newly converted database. See *Backing up the database (p. 141).*

To display the current version of the software, choose System from the Selection menu, click **System** and then click **Version info**.

After the upgrade is complete, ask users to check their voicemail and personal keys to ensure that they were not deprogrammed during the upgrade.

After upgrading a 3100 ICP to Release 4.x software, the Class Name may not appear on the displays of IP sets. Starting with Release 4.0 software and later, the Class Name will not be displayed on IP sets if a name is programmed for the particular line that the call is coming in on. If the customer would prefer to have the Class Name displayed instead of the Line Name, simply log into the System Tool and remove the name from the line. By default, each line is programmed with a name.

Applying a software patch

A software patch is used to fix a site specific problem in the software prior to the next official software release. Software patches are posted on the Mitel Online site.

To apply a software patch

1. Download the patch from Mitel Online to a PC on the LAN.
2. Launch the system tool.
3. Choose **System** from the Selection menu.
4. Click **Apply Patch**.
5. Read the instructions and then click **Proceed**.
6. Click **Browse** and then navigate to the patch file (.maz) on your PC

20 sec to 2 min

7. Select the file, click **Open** and then click **OK**.
8. After the files have been copied to the system the message "Operation Successful" is displayed
9. Reboot the system. See *Rebooting the system (p. 130)*.

The patch log identifies the software patches that have been applied to the current load of software. You can view the patch log by choosing **System** from the Selection menu, clicking **System** and then clicking **Version info**. You can also view the patch log by entering the command "patchShow" in a diagnostic session.

Performing backups

During a backup operation, do not navigate off the backup page and do not close your browser until the backup is complete.

Creating backup directories

Create backup directories on your laptop or PC where you can store backup files.

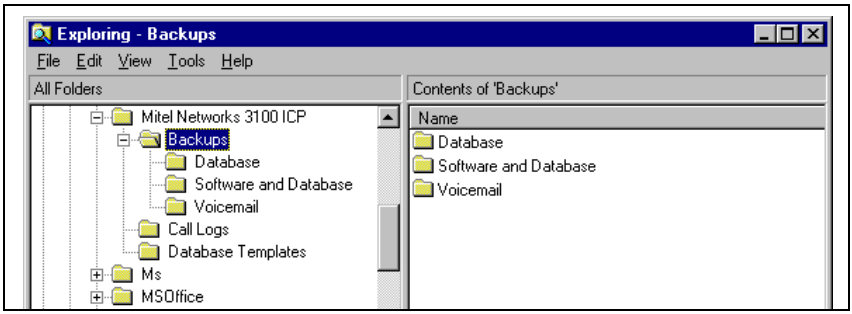


Figure 20: Backup directories

Backing up the database

A “database only” backup allows you to restore your database if it becomes corrupted.

To create a database backup

1. Launch the system tool. See *Launching the tools (p. 127)*.
2. Choose **System** from the Selection menu.
3. Click **Backup/Restore**, click **Database and Software** and then click **Backup**.
4. Read the instructions and then click **Proceed**.

Software 10 min to 20 min

5. Check the database option.

Database 15 sec to 2 min

6. Click **Save As** and navigate to a folder on your PC.
7. Select a file or enter a filename and click **Save**.

   It's good practice to include the date in the filename.
8. Click **Do Backup**.

   "Operation Successful" appears when complete.

Backing up the voice mail data

This procedure creates a back up of the current voice mail configuration that you save to your PC or laptop.

1. Launch the system tool. *Launching the tools (p. 127)*.
2. Choose **System** from the Selection menu.
3. Click **Backup/Restore**, click **Voice Mail** and then click **Backup**.
4. Read the instructions and then click **Proceed**.
5. Click **Mitel 3100 Full Voicemail**. A full backup will allow you to restore the voice mailbox programming, greetings, and messages. A medium backup only allows you to restore the voice mailbox programming and greetings.
6. Click **Save As**, navigate to a folder on your PC.
7. Select a file or enter a filename and click **Save**.
8. Click **Do Backup**.

15 sec to 2 min

"Operation Successful" appears when the backup is complete.

Saving call (SMDR) logs

You can save the system call logs to a directory on your computer and then either view them onscreen or print them out on a printer. Note that logs are not provided for the current day (that is, logs are only provided up to the end of the previous day).

In order to save call logs, you must first configure call logging. See *Configuring call logging (SMDR) (p. 73).*

1. Launch the system tool. *Launching the tools (p. 127)*.
2. Choose **System** from the Selection menu.
3. Click **Save Call Logs**.
4. Read the instructions and then click **Proceed**.
5. Click **Save As**, navigate to a folder on your PC.
6. Select a file or enter a filename and click **Save**.
7. Click **Save**
8. Click **Save Call Logs**.

15 sec to 1min

"Operation Successful" appears when the save is complete.

Using a remote access session

You can access the system tool, group administration tool, and desktop user tools from a remote PC.

To set up the 3100 ICP system to support remote access, you must set up remote access on the 3100 ICP system and then set up dial-up access from the remote PC.

Setting up remote access

You cannot perform this setup remotely (that is, you must perform this procedure on the 3100 ICP system, on site, before you can gain remote access).

1. Launch the system tool. See *Launching the tools (p. 127)*.
2. Choose **IP Networking** from the Selection menu.
3. Click **Router**, click **Destinations**, click **Remote**, click **Remote Destinations**, and then select **Net5** in the right pane.
4. Click **Change**.
5. In the **Name** field, enter "RAS" and click **Save**.
6. Click **Network Interface**, click **Net IP** and then click **Add**.
7. In the Net IP page set the following:
   - **Destination:** RAS
   - **IP Address Source:** Static
   - **IP Address:** Enter an IP address that will be used by the modem interface of 134.22.11.250
   - **Bitmask:** 255.255.255.000
8. Click **Save**.

9. Click **IP Routing**, click **Routing Table**, and then click **Add**.

10. In IP Routing Table page, set the following
    - **IP Address:** 000.000.000.000
    - **Bit Mask:** 0.0.0.0
    - **Next Hop Address:** enter the IP address of the gateway device (router, gateway, firewall)

11. Click **Save**.

12. Under **Destination**, click **Remote**, click **PPP Configuration** and then click **Add**.

13. In the PPP Configuration page, set the following
    - **Destination:** RAS
    - **Protocol:** PAP
    - **Remote Name:** enter “mn3100” as dial up username
    - **Remote Secret:** enter “mn3100” as dial up password
    - **IP Address:** select Override Address With:
    - **Override Address With:** enter 134.22.11.249
    - **Connect As:** select Server

14. Click **Save**.

15. In the **Destinations** folder, click **Remote**, click **Remote Connection** and then click **Add**.

16. In the Remote Connection page, set the following:
    - **Destination**: RAS
    - **Enable Link:** Select check box
    - **Call Type:** Incoming

17. Click **Save**.

18. Click **Destinations**, click **Remote**, click **Remote Destinations**, select **RAS** in the right pane, and then click **Change**.

19. Check the **Enable Destination** option box.

20. Click **Save**.

21. Commit your changes to the database.

Launching the tools from a remote session

To connect to the 3100 ICP modem using Windows Client Dialup Networking, you must use the Operator Assisted Dialing option. This option allows you to initiate the call using a standard phone attached to your modem.

Setting up Client Dialup Networking

1. In Windows 95/98/2000/XP/ME, open the **My Computer** folder.

2. Double-click **Dial-up Networking**.

3. Click **Next** or double-click the **Make New Connection** icon.

4. Enter the name of the 3100 ICP system, select your modem type and click **Configure**.

5. Click **Connection** and set the connection preferences to

   Data bits: 8
   Parity: None
   Stop bits: 1

6. Click **Options** and check the **Operator assisted or manual dial** box.

7. Click **Apply**.

The procedure for setting up Client Dialup Networking from Windows 2000 is similar except that the

Operator-Assisted Dialing option must be selected from the **Advanced** menu in the Network and Dial-up Connections window.

Setting up the remote connection

1. In the Dial-up Connections window, double-click the icon for the 3100 ICP system connection.
2. Using a standard phone that is connected to the modem, place a call to the 3100 ICP system attendant.
3. When the voice mail auto attendant answers, transfer your call to extension 1200 (system modem).
4. After your call has been transferred, click **Connect**.
5. Launch the required tool from the login page.

Changing extensions or set types

Changing an extension number or set type

If you change the extension number of an IP phone or change the set type, you must commit the database and then reset the phone for the change to take immediate effect. Otherwise, the system will automatically update the phone with the new extension number or set type within approximately 10 minutes.

If you are upgrading the system with 5200 series IP phones, you must first upgrade the system to Release 4.0 version software or higher. See *Upgrading the system (p. 133)*. After upgrading the system software, power down the system, connect the new sets, and reboot the system.

Reset the phone

To reset the IP phone manually, disconnect the LAN cable (and the power adapter, if present) from the IP phone. Then reconnect.

To reset an IP phone from the system tool.

1. Choose **System**, click **IP Sets Powering** and then click **Change**.
2. Change the power source for the IP phone.
3. Click **Save**.
4. Click **Change** again and return the IP phone to the original setting
5. Click **Save**.

Creating a user guide

You can create customized user guides for phone users through Manual Maker. Manual Maker is a web-based application on Mitel Online that you can access through the group administrator's tool.

To launch Manual Maker, you must have internet access. To print user guides you need a printer connected to the LAN.

To create user guides

1. Launch the group administration tool. See *Launching the tools (p. 127)*.
2. Choose **I want to Create User Guide**.
3. Follow the onscreen instructions.

Using a database template

You can use database templates to reduce the amount of time that it takes to program a system. A database template is simply a copy of an existing database that does not include MAC addresses. You can load a database template into a new system through the quick installation tool or system tool.

If you are installing multiple systems that have similar settings you can program a system with these settings and save it as a template for other systems.

Database templates are hardware independent.

Save a database template

1. Identify the common characteristics that you want to save in the template (for example, numbering plan, extension group programming, or line configuration settings).
2. Program a system database with these common characteristics.
3. In the system tool, choose **System** from the Selection menu.
4. Click **Database Template** and then click **Save**.
5. Read the instructions and click **Proceed**.
6. Click **Save As**, navigate to a folder on your PC, and designate a file. Click **Save**.
7. Click **Make Template**.

   "Operation Successful" appears when the template has been copied to the specified folder.

Loading a database template

1. Take the database template to site on your laptop.
2. When you run the quick configuration tool during the installation procedure, choose to replace the existing default database with your template database.
3. Complete programming as required.

Maintenance tips

- Keep regular backups.
- Ensure that you record your SysID module number and your MOSS number.
- Record all passwords.

Chapter 6
Troubleshooting and repair

Checking the system LEDs

Table 2: System LEDs states

LED	Colour	State	Meaning
Power LED on Control Unit	Green	Off	System is powered off
		Flashing	System is starting up Board Support Package (BSP)
		On steady	System is powered up and running
	Amber	Flashing	Running bootrom VX Works
		On steady	Running diagnostics
	Red	On steady	After you press and release the Config switch the power LED flashes red for 30 seconds and then turns solid red. After the power LED turns solid red it is safe to disconnect the power.
	Red	On steady	Error condition with diagnostics
	Red and Amber	Alternating Red and Amber	System is updating the bootrom and MMC firmware and IP expansion unit DO NOT POWER DOWN WHILE POWER LED IS ALTERNATING RED AND AMBER.
Power LED on Expansion Unit (Release 4.0 hardware and later)	Green	Off	Unit is powered off
		Fast Flash	0.5 s on 0.5 s off indicates expansion unit 1
		Slow Flash	1 s on 1 s off indicates expansion unit 2
		Very Slow Flash	2 s on, 2 s off indicates standalone mode (being used as Layer-2 switch)
	Red	Flashing	Unit is booting (flashes for approximately 5 seconds) or if longer than 5 seconds, fan has stopped working.
	Green/Red	Flashing	Some IP phones or IP appliances are not receiving power because the maximum power supply has been exceeded. Connect power adapters to the IP appliances.

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Table 2: System LEDs states (continued)

LED	Colour	State	Meaning
ONS	Green	Off	Idle
		On	In use
		Flashing	Incoming call
	Amber	Off	Idle
		On	Busy
LS/CLASS	Green	Off	Line inactive
		On	Line active
	Amber	Off	Circuit is idle
		On	Circuit is busy
Ethernet WAN	Green	Off	Link inactive
		Flashing	Transmitting data
	Amber	Off	Link speed 10 MB/s
		Flashing	Link speed 100 MB/s
Ethernet	Green	Off	Link inactive
		Flashing	Transmitting data
	Amber	Off	Link speed 10 MB/s
		ON	Link speed 100 MB/s
		Flashing	Faulty link

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Table 3: T1/E1 Plus Module: T1/E1 Line LEDs

T1/E1 Line LED (Top LED)	T1/E1 Line Statue LED (Bottom LED)	State or Corrective Action
Off	Off	T1/E1 Module is powered down
Off	Flashing Green	Layer 1 is synchronized. Wait a few minutes for D-channel to be established
Off	Solid Green	Normal operation
Solid Yellow	On or Off	Check link with analyzer
Solid Yellow	Solid Green	Check link with analyzer
Solid Red	Solid Green	Check line connection. Check the line termination. Ensure that it complies with the connected interface.

Table 4: T1/E1 Plus Module: LAN/xDSL LEDs

LED	LED Status	Meaning
Link Speed (Top)	Amber	Link operating at 100 Mb/s
	Off	Link operating at 10 Mb/s
Link Activity (Bottom)	Green	Link active
	Off	Link inactive

Table 5: T1/E1 Plus Module: On-Board Processor Status (PPC) LEDs

LEDs	LED Status	Meaning
On Board Processor Status	Red	Processor held in reset
	Flashing Amber	System is loading software into processor
	Solid Amber	Processor is booting
	Flashing Green	Normal operation

Checking the logs

You can view maintenance and software logs through the system tool.

1. Launch the system tool. See *Launching the tools (p. 127)*.
2. Choose **Diagnostics** from the Selection menu.
3. Click **Logs** and then click **All Logs**.
4. To view the oldest log messages.
   - In the Go to: field, select **Page #**
   - In the Value field, enter the last page number
   - Click **Go**.
5. Check the list for Error or Warning logs.

Viewing diagnostics

You can view the diagnostics that are output by the 3100 system through a local or remote diagnostic session. Note that maintenance commands are not available through a diagnostic session. See *Using maintenance commands (p. 162)*.

Starting a local diagnostic session

To start up a local diagnostic session, you need

- one Male “DB9 to RJ45” connector
- one Female “DB9 to RJ45” connector
- one CAT5 patch cord
- communication application (such as Hyperterminal)
- a computer or laptop.

Since you are running a local diagnostic session you do not require a modem. In the following procedure, Hyperterminal is the communications application.

To collect diagnostic information

1. Connect an RS-232 cable between the lower DB9 port on the front panel of the controller and a COM port on a laptop or computer.

Do not leave the RS-232 diagnostics cable disconnected from the computer or laptop COM port during system bootup (that is, either connect the cable to the PC or disconnect it from the diagnostics port).

2. From the **Start** menu, click **Programs**, click **Accessories**, click **Hyperterminal**, and then click **Hyperterminal**.

3. Enter a name for the connection (for example, MN3100) and click **OK**. The Connect To window opens.

4. In the Connect using field, select the COM port of the PC that you have connected to the 3100 ICP system (for example, "Direct to COM1). Click **OK**.

5. Set the port settings to
   Bits per second: 9600
   Data Bits: 8
   Priority: None
   Stop Bits: 1
   Flow Control: None

6. Click **OK**.

7. Type the **Enter** key to display the Hyperterminal prompt.

8. Proceed to *Checking the bootup script (p. 161)*.

Starting a remote diagnostic session

To start a remote diagnostic session

1. Set up remote access to the 3100 ICP system. See *Setting up remote access (p. 144).*

2. Set up client dial-up networking on your PC. See *Setting up Client Dialup Networking (p. 146).*

3. Set up the remote connection. See *Setting up the remote connection (p. 147)*.

4. From the **Start** menu, click **Programs**, click **Accessories**, click **Hyperterminal**, and then click **Hyperterminal**.

5. Enter a name for the connection (for example, MN3100) and click **OK**. The Connect To window opens.

6. In the Connect using field, select the COM port of the PC that you have connected to the 3100 ICP system (for example, “Direct to COM1). Click **OK**.

7. Set the port settings to
   Bits per second: 9600
   Data Bits: 8
   Priority: None
   Stop Bits: 1
   Flow Control: None

8. Click **OK**.

9. Type the **Enter** key to display the Hyperterminal prompt.

10. Proceed to *Checking the bootup script (p. 161).*

Checking the bootup script

To check the bootup script

1. With the Hyperterminal application connected and running, power down the 3100 ICP system and then power it on again.

2. Watch the data that appears in the Hyperterminal window during bootup
   - Database errors in the bootup script indicate that you need to perform a database restore. See *Restoring the database (p. 180).*
   - Errors referencing ATA1 indicate a faulty hard drive. See *Replacing a faulty hard disk (p. 188)*.
   - Errors referencing ATA0 indicate a faulty flash. See *Replacing the flash card (p. 184)*.

Using maintenance commands

You enter maintenance commands through a secure Telnet server connection that uses Open Secure Socket Layer/Transport Layer Security (SSL/TLS) protocol. SSL prevents other parties from being able to monitor your Telnet sessions to the 3100 system.

Note that maintenance commands are not available in a diagnostics session (VxWorks shell).

Launching a maintenance session

1. Install the secure Telnet application on the client station. You can download the required Telnet application from the Mitel Online site at www.mitel.com.

2. For a local connection, connect an RS-232 cable between the lower DB9 port on the front panel of the controller and a COM port on a laptop or computer.
   or
   For a remote connection:
   - Set up remote access to the 3100 ICP system. See *Setting up remote access (p. 144).*
   - Set up client dial-up networking on your PC. See *Setting up Client Dialup Networking (p. 146).*
   - Set up the remote connection. See *Setting up the remote connection (p. 147)*.

   If you choose to use a local connection, do not leave the RS-232 diagnostics cable disconnected from the computer or laptop COM port during system bootup (that is, either connect the cable to the PC or disconnect it from the diagnostics port).

3. Launch the Telnet application.

4. Type "`Open 192.168.1.2`" (where 192.168.1.2 is the IP address of the 3100 system WAN interface) and press the **Enter** key.

5. Enter the username (default: `Telnet`).
6. Enter the password (default: `mnet`).
7. At the `System Go >` prompt, enter the desired maintenance command.

Ensure that you end your maintenance session with the `logout` command. Otherwise, you may not be able to launch the system tools until the Telnet session expires automatically (15 minutes).

The Telnet session closes automatically if it is inactive for more than 15 minutes.

General Commands

Display help on commands

help

Display the system date

date

Display the system time

time

Reboot the 3100 ICP system

reboot

This command takes the system out of service for approximately 20 minutes

Save (commit) the database

save

Display system logs

show_all

Lists the most recent 10 software and maintenance logs. Repeat the command to show the next 10 logs.

show_all <e, w, or i>

Lists the error logs <e>, warning logs <w>, or information logs <i>. Repeat the command to show the next 10 logs.

Close the Telnet session

logout

Call Control Commands

Display system information

print general_info

List entries in the directory

dispdir <dir_type> <start offset>

Where <dir_type> is "system" or "line" and <start offset> is the starting directory number.

For example:

dispdir system 1

Display call forward/divert information

divert <term instance>

divert line <line instance>

divert hops <number of hops>

Convert extension numbers to instance numbers

extn_to_inst <extension #>

Lists the instance number that is assigned to the extension number.

Convert instance numbers to extension numbers

inst_to_extn <instance #>

Lists the extension numbers that are assigned to the instance number.

Display fault information

faults <priority>

Lists fault information for the specified priority and above (where priority is 1, 2, 3, 4 or W).

List system speed dial codes/short code access

print short_code

Lists the line groups and the class of services that are allowed to use the short codes.

Display programmable key information for a set

progkeys <term instance number> primary

Display terminal information (set capabilities)

terminal_info <instance #>

Display terminal status

terminal_status <instance #>

Displays the status of the features on the set; for example, Do Not Disturb not active, no Messages Waiting, and so forth.

Check voice mail disk usage

disk_usage

Display voice mail port status

port_status

Networking commands

Pinging a device

ping

View the route table

trace_route <dest> <timeout> <maxhops>

Where <dest> is the IP address of the destination.

Show information about network interfaces

if_show

List the ARP cache

arp_show

List the routing table

route_show

List the DNS host table

host_show

Show all Internet protocol sockets

inet_stat_show

Digital trunk commands

Digital trunk commands are only available if a T1/E1 MMC Plus module is installed in the system.

Obtain help on Dvoc commands

dvoc help

Display link statistics

dtstat <module #> <link #>

Clear link statistics

clrstat

Display digital trunk state

dvoc state <option module #> <link #>

or

dvoc state <option module #> <link #><channel #>

Busy out links or trunks

dvoc busy <option module #> <link #>
or

dvoc busy <option module #> <link #> <channel #>

Return links to service

dvoc rts <option module #> <link #>
or

dvoc rts <option module #> <link #> <channel #>

Listing the state of the synchronization source

netsync state
Lists the state of the synchronization, depending on what you have programmed in the following form of the System Tool: Voice->Digital Lines and Trunking -> Network Synchronization. This command shows the module numbers and link numbers of all the listed sync sources.

Setting the synchronization source

netsync setsource <#-#>
Where #-# is the priority number from the network synchronization form.

netsync setsource freerun
Changes the current synchronization source to Freerun. A netsync state will show all sync sources as available.

netsync setsource auto
Automatically sets the sync source to the 1st clock source priority that is available.

Using Windows networking commands

Use Windows networking commands to help you gather network information and troubleshoot problems. To access a DOS command window from a computer, click **Start**, click **Programs** and then click **Command Prompt** or **MS-DOS Prompt**. The command window opens.

- **IPConfig** (WinNT only): Displays the TCP/IP-related configuration of a host. Use the **/all** option with this command to list a configuration report for all the host's interfaces, including any configured serial ports (RAS).
- **Winipcfg** (WIN 95/98): Provides the same function as the **IPConfig** command for Windows 95/98 computers.
- **Ping**: Allows you to verify IP-level connectivity. It sends an echo request to a target IP address or host name. You should first try pinging the IP address first. If that succeeds, then try pinging the host name.

  If pinging by address succeeds, but pinging by name fails, the problem lies in name resolution, not network connectivity.

- **Arp**: Allows you to view the Address Resolution Protocol cache. If two hosts on the same subnet cannot ping each other successfully, run the command **Arp -a** command on each computer to see if the computers have the correct MAC addresses listed for each other. You can use **IPConfig** to determine a host's MAC address. If another host with a duplicate IP address exists on the network, the ARP cache may have had the MAC address for the other computer placed in it. Use the **Arp -d** command to delete an entry that may be incorrect. You can then add the correct entry using the **Arp -s** command.
- **Tracert:** Allows you to view or modify the route table. Tracert uses the IP TTL field and ICMP error messages to determine the route from one host to another through a network.
- **Route print**: Displays a list of current routes known by IP for the host.
- **Route add:** Adds routes to the table.
- **Route delete:** Removes routes from the table.
- **Netstat:** displays protocol statistics and current TCP/IP connections. **Netstat -a** displays all connections. **Netstat -r** displays the route table and any active connections. **Netstat -e** displays Ethernet statistics.

Line troubleshooting

Table 6: Line troubleshooting

Symptoms	Probable causes	Corrective actions
Unable to make any external calls or frequently unable to access an external line.	Service provider has not connected lines.	Unplug the cable that connects the line service to line port on the system. Connect a standard analog phone or telephone test phone and plug it directly into the service providers line socket. Listen for dial tone. Check each line. If dial tone isn't present on all lines contact your service provider.
	Faulty programming.	Verify that your line groups (outgoing lines), hunt maps (outgoing lines), and ring maps (incoming lines) are programmed correctly. See *Configure the ring maps (p. 58)*.
	Faulty line module.	Power down the system. Remove and replace the suspect line module. See *Installing option modules (p. 133)*.

IP port troubleshooting

Table 7: IP port troubleshooting

Symptom	Probable cause	Corrective action
All IP phones and IP appliances are not receiving power.	Controller not fully intialized	Ensure the controller is fully initialized. The Power LED on controller should be sold green.
All IP phones and IP appliances connected to an expansion unit are not receiving power.	Expansion is not fully initialized.	Ensure that the expansion unit is fully initialized The Power LED on expansion unit flashing green.
	Loose uplink cable connection	Check all uplink cable connections.
Only some of the IP phones and IP appliances connected not receiving power.	IP powering is not enabled for the ports in System Tool programming,	Launch the System Tool and enable the Phantom Feed Enabled box for the ports. See *Identify the power source of the IP phones (p. 49)* for instructions.
	Too many IP appliances are phantom powered.	Up to eight IP appliances can be powered by the system (phantom power feed). Use a power adaptors to power all other IP appliances.
All of the IP phones and IP appliances on a 24-port expansion unit or Release 4 version 16-port expansion module are not receiving power	Fan has failed	Check the power LED on the expansion unit. If the LED is flashing red then the expansion unit's fan has failed. Replace the fan.

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Table 7: IP port troubleshooting (continued)

Symptom	Probable cause	Corrective action
Only some of the IP phones and IP appliances on a 24-port expansion unit or Release 4 version 16-port expansion module are not receiving power	Maximum power has been reached	Check the power LED on the expansion unit. If the LED is flashing green and red then the maximum power load has been reached. Disconnect a few of the IP phones from the expansion unit and check to see if the IP sets are now powered. If they are now powered the maximum system power load had been exceeded. If the IP phones remain unpowered, refer to Table 8 (page 173).
You connect an IP phone to a port and the phone doesn't function.	The phantom power feed is disabled	Enable phantom power feed for the port. See *Identify the power source of the IP phones (p. 49)*

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IP phone troubleshooting

Table 8: IP phone troubleshooting

Symptom	Probable cause	Corrective action
Unable to place calls from an IP phone. Phone is unresponsive.	Phone is locked up.	If an IP phone appears to be locked up and is displaying “Mitel Networks”, reset the phone by disconnecting it and then reconnecting it.
	Faulty programming.	Verify that your number plan, extension groups, and secondary number plan are programmed correctly. See *Modify the extensions and system directory (p. 54).*
	Faulty phone.	Replace the phone with a known working phone of the same model to determine if the phone is faulty.
	Faulty connection through the network.	Verify that you can ping the set. If not, check the connections between the 3100 ICP layer-switch 2 port and the desktop drop including patch panel connections.
	Incorrect NIC card settings.	Check the LAN devices (PC NIC cards, switches, 3100 ICP switch settings and Ethernet ports all have the same Ethernet settings (auto-sensing, 10BaseT or 100BaseT).

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Table 8: IP phone troubleshooting (continued)

Symptom	Probable cause	Corrective action
Unable to login to the Desktop User Tool. You receive the error message, "Current Session Terminated by Client"	Application is confused by temporary internet files stored on your PC.	Delete the temporary Internet files from your PC. Click **Start**, click **Settings**, click **Control Panel**, click **Internet Options** and then click the **General** Tab. Under **Temporary Internet files**, click **Delete** files.
You connect an IP phone to a port and the phone doesn't function.	The phantom power feed is disabled	Enable phantom power feed for the port. See *Identify the power source of the IP phones (p. 49)*

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Analog phone troubleshooting

Table 9: Analog phone troubleshooting

Symptom	Probable cause	Corrective action
Unable to place calls from an analog phone.	Faulty connection at the extension.	Ensure that the line cord is properly connected to the wall and phone sockets. Replace the line cord.
	Faulty programming.	Verify that your number plan, extension groups, and secondary number plan are programmed correctly. See *Modify the extensions and system directory (p. 54).*
	Faulty phone.	Replace the phone with a known working phone of the same model to determine if the phone is faulty.
	Faulty connections at patch panel.	Check the cable that connects the 3100 ICP ONS port to the patch panel. Check the terminations.
	Faulty wiring between system and phone.	Disconnect the extension cable from the ONS port on the system and plug a phone directly into the ONS port. If the phone works when it is connected directly to the ONS port, check the building wiring, especially for loose connections at terminations.
	Faulty ONS module or faulty controller (two ONS ports are provided by the control board in the system controller)	Power down the system. If the faulty ports are on an ONS module, remove and replace the suspect ONS module. See *Installing option modules (p. 133)*. If the ONS ports are on the controller, replace the controller.

System troubleshooting

Table 10: System troubleshooting

Symptom	Probable cause	Corrective action
You receive Database Error messages while entering data in the system tool. Data that you know you have saved in a page of the system tool disappears. Data in the tools is not appearing correctly. You cannot enter data in a field. The user interface of the tool behaves erratically. Database errors appear in the bootup script. See *Viewing diagnostics (p. 159)*.	Incorrect version of Internet Explorer. Corrupted database. Data element already exists (for example, MAC address already in form).	Obtain required version of Internet Explorer. See *PC requirements (p. 25)*. See *Fixing database or software corruption (p. 180)*.
Read/Write errors to ATA1 (hard disk) appear in the bootup script. See *Viewing diagnostics (p. 159)* and *Starting a remote diagnostic session (p. 160)*.	Hard disk failure.	Reformat the hard disk. Replace the hard disk. See *Replacing a faulty hard disk (p. 188)*.

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Table 10: System troubleshooting (continued)

Symptom	Probable cause	Corrective action
Voice mail isn't working	Voice mail ports are locked up. Improper programming. Hard disk failure.	Dial the voice mail ports directly (1056 to 1063). Reboot the system. See *Rebooting the system (p. 130).* Check voice mail programming. See *Program the digital trunks (p. 58)* Replace the hard disk. See *Replacing a faulty hard disk (p. 188).*
Software upgrade to the next version fails.	Software problem.	See *Restoring the system with previous software (p. 181).*

Network troubleshooting

Check network connectivity after each corrective action.

Table 11: Network troubleshooting

Symptom	Probable cause	Corrective action
Layer-2 switch port LED is off.	Faulty connection between 3100 ICP layer-2 switch port and the patch panel	Check connection
	Faulty connections between PC and IP phone.	Ensure cables are connected correctly. Refer to the installation guide that was shipped with the IP Phone.
	Faulty cable.	Ensure that you are using a straight through Ethernet cable and not a cross-over cable.
	Incorrect NIC card settings.	Check the LAN devices (PC NIC cards, switches, 3100 ICP switch settings and Ethernet ports all have the same Ethernet settings (auto-sensing, 10BaseT or 100BaseT).
Layer-2 switch port LED is on but there is no connectivity between the system and a computer	The computer has not been assigned an IP address.	Set the network parameters of the computer to "Automatically get an IP address assigned" or to DHCP.

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Table 11: Network troubleshooting (continued)

Symptom	Probable cause	Corrective action
Layer-2 switch port LED is on but there is no connectivity between the system and a computer.	Incorrect IP address assigned to the computer.	Run the **winipcfg** command (WIN95/98) or the **Ipconfig** command (NT and Windows 2000) to verify the IP address that is assigned to your network interface card (NIC) card. Verify that you can ping the 3100 ICP and other devices that are on the LAN from your PC.
	Proxy settings for Browser are incorrect.	Verify that your Browser has the proper Proxy settings for your network.
	Physical path to destination is faulty.	Check physical path using the “tracert” command.

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Fixing database or software corruption

Software or database corruption can occur due to user error, hardware failure, or software problems. Use the following procedures to fix database or software corruption.

Database restore: If the database is faulty and the information that is programmed in the database is corrupted, restore the database from the latest database backup.

Previous software and database restore: During an upgrade, the system automatically takes a backup of the system software and database and places it on the hard drive. If a software upgrade fails, you can go back to the previous version of software and database by using the CONFIG and RESET switches. See *Restoring the system with previous software (p. 181)*.

Factory software and database restore: You can restore the factory version of the software and database using the CONFIG and RESET switches. See *Restoring the system with the factory software (p. 182)*.

Voice mail data restore: If you need to recover a voice mail database, perform a voice mail data restore.

Restoring the database

1. Launch the system tool. See *Launching the tools (p. 127)*.
2. Choose **System** from the Selection menu.
3. Click **Backup/Restore**, click **Database**, and then click **Restore**.
4. Read the instructions and click **Proceed**.
5. Click **Browse**, navigate to the latest database backup file (.maz) and click **Open**.

6. In the Restore table, select “Mitel Networks 3100 Databases”.
7. Click **Do Restore**.

2-5 min

8. The restore begins automatically and “Operation Successful” appears when the restore is complete. A “database” restore takes approximately 2 to 5 minutes to complete. During the restore the system is operational.
9. Click **Reboot the 3100 ICP**.

   After a database restore, the system takes approximately 10 minutes to reboot. During the reboot the system is out of service.
10. Through the system tool, check the corruption has been corrected.

Restoring the system with previous software

This procedure overwrites the current version of the database and software with a previous software version and database. If you have not performed an upgrade of the system since the initial installation, this procedure will simply reboot the system. Before proceeding, ensure that you have recent database backups available.

If you perform a software upgrade, and you experience problems with the upgraded software, you can use this procedure to restore the previous version.

1. Locate the CONFIG switch and RESET switch on the front panel of the controller (see Figure 15 (page 131)).
2. Straighten out two paper clips.
3. While the Power LED is on solid green, press and release the CONFIG switch once. The Power LED begins flashing and then turns solid red. Telephone service is lost.

4. After the Power LED is solid red, press and hold down the CONFIG switch. Then, press and release the RESET switch. The Power LED begins flashing red.

5. Release the CONFIG switch. (Do not press the CONFIG switch again).

35 min

The system reboots. If an upgrade has been done on the system, it boots with the previous version of the software and database.

Restoring the system with the factory software

This procedure overwrites the current version of the database and software with the factory version (Golden image) of the software and database. If your backup version contain errors that cannot be removed, you can restore the factory version and then manually reprogram the system to exclude the fatal error.

1. Locate the CONFIG switch and the RESET switch on the front panel of the controller (see Figure 15 (page 131)).

2. Straighten out two paper clips.

3. While the Power LED is on solid green, press and release the CONFIG switch once. The Power LED begins flashing and then turns solid red.

4. After the Power LED turns solid red, press and hold down the CONFIG switch. Then, press and release the RESET switch. The Power LED begins flashing red.

5. Release the CONFIG switch. The Power LED begins flashing amber.

6. Press and release the CONFIG switch again within 6 seconds.

35 min

The system shuts down and reboots with the factory version (Golden image) of software and database.

7. If you have purchased options since the initial install, you must re-enable your options. See *Enabling your licensed options (p. 128).*

8. Manually reprogram your system. Apply any patches or templates that came with the system.

9. Restore your voice mail database. See *Restoring voice mail data (p. 183).*

Restoring voice mail data

1. Launch the system tool. See *Launching the tools (p. 127)*.

2. Choose **System** from the Selection menu.

3. Click **Backup/Restore**, click **Voice Mail**, and then click **Restore**.

4. Read the instructions and click **Proceed**.

5. Click **Browse**, navigate to the latest voice mail database backup file (.maz).

6. Select **Restore Mitel Networks 3100 Full Voicemail**.

7. Click **Do Restore**. The voice mailbox programming, greetings and messages are restored.

15 secs
5 min

The restore begins automatically and “Operation Successful” appears when the restore is complete.

8. Call into the auto attendant and the voice mailboxes to ensure that they are responding correctly.

Replacing faulty components

This section covers replacing the flash card and hard disk. Refer to the Hardware User Guide for instructions on how to replace other components.

Replacing the flash card

Do not proceed with this procedure until you have obtained the MOSS password for the system. This procedure takes the system out of service for approximately 60 minutes.

Note that the flash card does not include the voice mail prompts.

To perform a flash card replacement you require

- Laptop or PC with Hyperterminal or equivalent communication package
- System software CD-ROM (for the voice mail software)
- Adapter cable.

You can build an adapter cable using a DB9 to RJ45 connector and a straight RJ45 patch cable. See *Cable pinouts (p. 231)*.

To perform a flash upgrade

1. Perform backups (including a voice mail data backup).
2. On the laptop or PC, start up the Hyperterminal application (click **Start**, click **Programs**, click **Accessories**, click **Hyperterminal** and then click **Hyperterminal** again).
3. Enter a name for the New Connection and click **OK**.

4. Ensure that the Connect Using field is set to the port that you are going to use (COM1 or COM2) and then click **OK**.

5. Set the port settings to
   - **Bits per second:** 9600
   - **Data bits:** 8
   - **Parity:** None
   - **Stop bits:** 1
   - **Flow Control:** None.

6. Power down the 3100 ICP system.

7. Attach an anti-static strap.

8. Remove the top cover of the controller.

9. Locate dipswitch S1. It's positioned next to the round SysID module (see Figure 21 (page 185)).

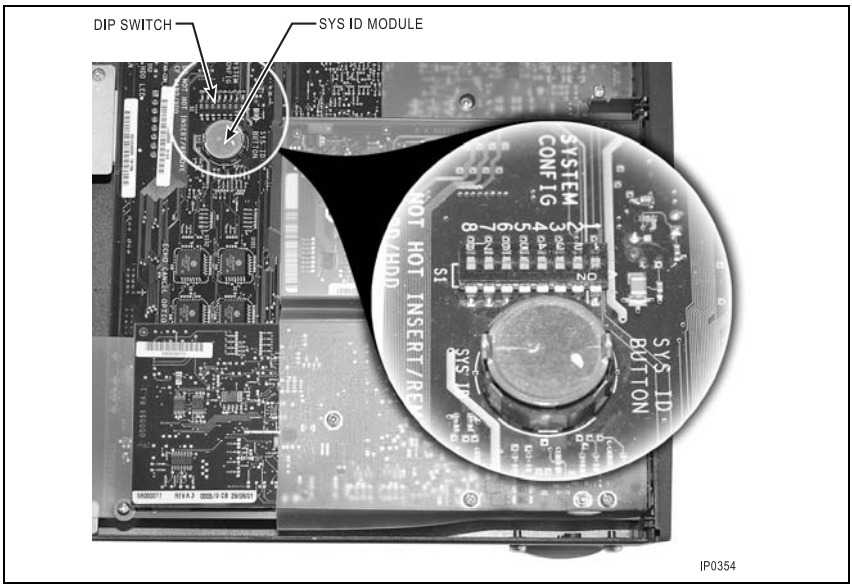

Figure 21: Location of dipswitch S1

10. Set dipswitch S1 (located closest to the printed circuit card) to ON to allow diagnostic information to be sent through the lower DB9 console connector.

11. Connect the lower DB9 male connector on the front panel of the controller to the female COM port on the laptop using a CAT5 patch cord.

Do not leave the RS-232 diagnostics cable disconnected from the computer or laptop COM port during system bootup (that is, either connect the cable to the PC or disconnect it from the diagnostics port).

12. Remove the existing flash card and replace it with the new flash card. If the flash card does not install easily, you may have it upside down. See Figure 22 (page 186) for the location of the flash card.

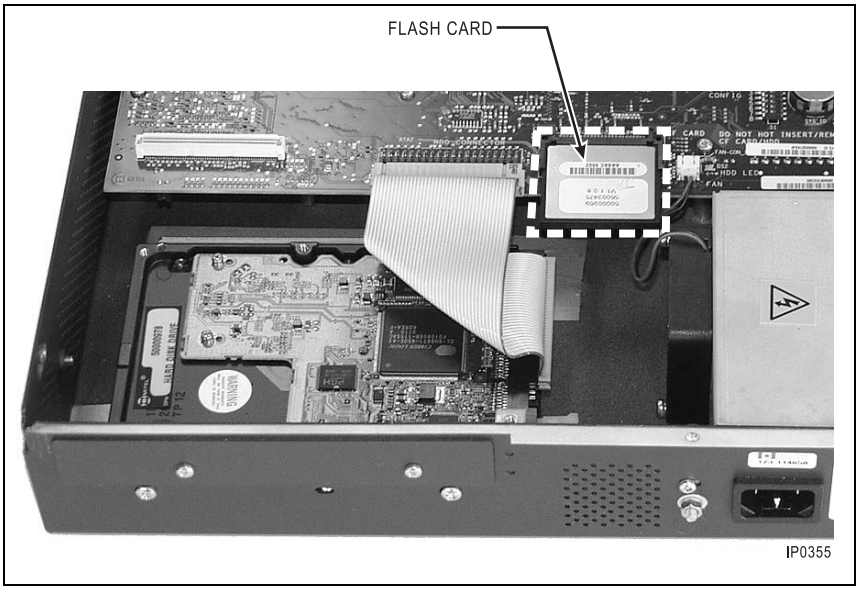

Figure 22: Flash card

13. Launch Hyperterminal and connect to the 3100 ICP system. See *Viewing diagnostics (p. 159)*.

14. Power up the 3100 ICP system.

15. Diagnostic information will be displayed on the screen. When the following text appears:

    Recovery Lite Begin
    Looking for valid software
    Verifying image /ata0/vxWorks
    Recovery Lite Success
    Press any key to stop auto-boot. .

    7

    6

    5

16. Press any key.

17. Hyperterminal displays “MN3100 ICP->”.

18. Type “syshd” and press the **Enter** key.

    The following prompt is displayed “This will destroy the contents of your Hard Disk. Do you with to abort this operation?”

19. Type “N” and press the **Enter** key to reformat the system hard drive.

    This step destroys the contents of the hard drive. All settings and voice mail messages will be lost.

20. The system begins reformatting the hard disk. Diagnostics appear on the screen. When the hard disk is reformatted “MN3100 ICP->” is displayed.

21. Power down the controller and power it back up again to reboot the system.

60 min

    The system takes approximately 60 minutes to boot up with the new flash. After the system has is fully loaded, the green power LED will be on steady.

22. Launch the system tool and enable your licensed options. See *Enabling your licensed options (p. 128)*.

23. Re-install the voice mail prompts from your system software CD-ROM. You must install them from your

CD-ROM because they are not included on the flash card

- Insert the software CD-ROM in the PC CD-ROM drive
- In the system tool, choose **System** from the Selection menu.
- Click **System**, click **Install Voicemail** and then click **Proceed**.
- Click **Browse** and navigate to file **vmail_<load>_<country>.maz** and then click **Open.**
- When the software has finished loading, click **Reboot the system**.

24. Restore your system database. See *Restoring the database (p. 180)*.

25. Restore your voicemail data. See *Restoring voice mail data (p. 183)*.

Replacing a faulty hard disk

Obtain a formatted hard disk from Mitel Networks Corporation.

1. Ensure that you have a software and database back-up available.

2. Power down the system. *Powering down the system (p. 131)*.

3. Attach an anti-static strap.

4. If your system has an expansion unit, disconnect the up-link cable from the up-link card connector.

5. Remove the retaining screws and lift the cover away from the controller.

6. If your system has an expansion unit, remove the screws holding the up-link card. The position of the up-link card is shown Figure 23 (page 189).

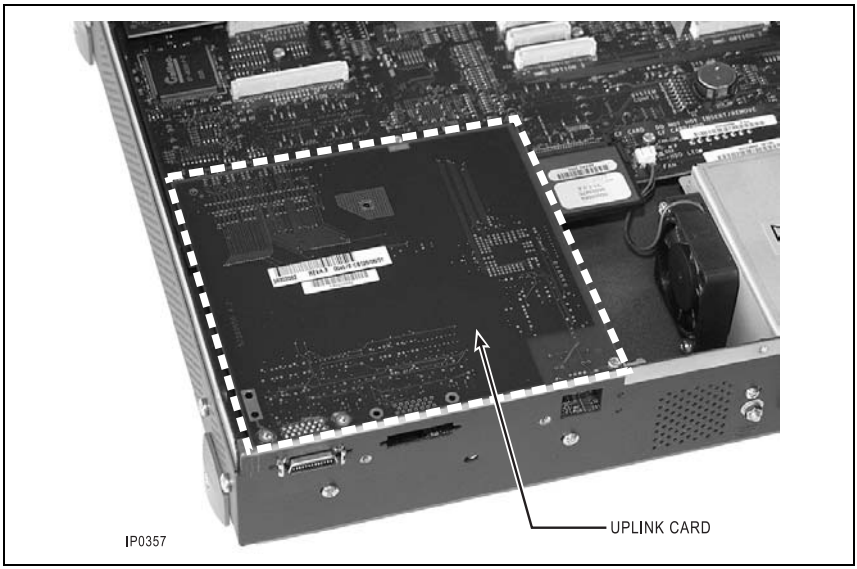

Figure 23: Uplink card

7. Carefully lift the up-link card away from the control unit, disconnecting the connectors on the underside, and at the same time guiding the connectors at the rear through the opening in the casing.

8. Disconnect the power supply connector and the ribbon cable from the hard disk.

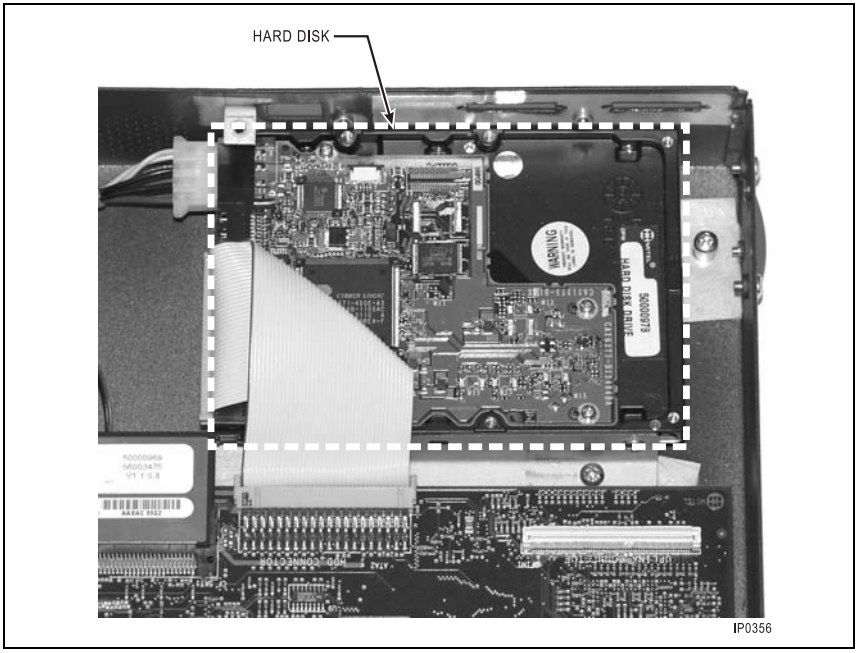

Figure 24: Hard disk

9. Remove the hard disk mounting screws, two at the top of the disk and two at the rear of the control unit casing, and lift the hard disk away.

10. Install the new hard disk with the hard disk mounting screws.

11. Refit the up-link card and connect the uplink cable, if required.

12. Replace the cover.

13. Power up the system and restore your database to the hard disk. See *Restoring the database (p. 180)*.

14. Restore your voicemail data. See *Restoring voice mail data (p. 183)*.

Field replaceable units

Description	Marketing Part Number
Controller (2+4+8)	50000962
Controller (2+4+8) French (Cdn)	50001004
Controller Bell Canada - English	50002033
Controller Bell Canada - French	50002034
Controller (2+4+8) Analogue (NA Spare)	50000992
Expansion (8) inc. uplink kit	50000963
Expansion (16) inc. uplink kit	50000964
Expansion (24) inc. uplink kit	50002145
Expansion (16) inc. uplink kit (new)	50002146
Expansion Up-link Card	50000965
Expansion Up-link Cable	50000966
Controller Power Cord (NA)	50000967
Expansion Power Cord - Y (NA)	50000968
128 Mb Compact Flash (NA)	50000969
4-Port ONS Extension Module	50000970
2-Port ONS Extension Module	50000971
Analog Services Module	50000973
PRI/T1 Module	50000974

Troubleshooting tips

- Always check the physical components, such as the cables, NIC cards, wall jacks, hubs and switches before you begin troubleshooting the network settings (IP addresses, router configuration, gateway settings and so forth).
- Ensure that you have a physical connection between the IP phone and/or computer and the layer-2 switch port on the system before you begin troubleshooting the network settings. If there is a physical connection between the port and the network device, the LED for the layer-2 switch port will be solid green. Refer to for *Checking the system LEDs (p. 155)* details on the other LEDs.

Appendix A
Default database

Default Database

This appendix provides the defaults for the following parameters

- Numbering plan
- Numbering assignment
- Analog set configuration
- Analog line configuration
- Digital trunk descriptors
- PRI T1 and E1 descriptors
- Class of service
- Class of restriction
- Timers
- Feature access codes.

Refer to the system tool online help for descriptions of all the available parameters and their defaults.

Numbering plan

Digit	NA Function	UK Function
0	Attendant	Operator
1	Secondary: Extensions	Secondary: Extensions
2	Secondary: Groups	Secondary: Groups
3	Three-Party (Conference)	Three-Party (Conference)
4	Speed Call (Short Code)	Speed Call (Short Code)
5	Ring Back (when free)	Ring Back (when free)
6	User (Feature) Code	User (Feature) Code
7	Unpark	Unpark
8	Call Pickup (extension group)	Call Pickup (extension group)
9	Out Access (hunt lines)	Out Access (hunt lines)
*	Supervisor	Not applicable

Numbering assignment

The default number assignment is as follows:

- 1000 - 1055 for IP phones
- 1056 - 1063 for voice mail
- 1100 - 1109 for analog
- 1200 and 1210 for modem
- 1400 - 1449 for voice mail virtual extensions
- 1600 for analog services card pager

The default extension numbers for the IP phones are assigned in the order that you connect the phones to the system. The first IP phone that you connect to the system is assigned as the administrator extension (ext 1000).

Analog set configuration

- Device type:Phone
- Analog recall type:Calibrated flash
- Analog recall event:Hold
- External voice mailNo
- Ext voice mail pre-dial digitNo
- Door intercom unitNo

Analog line configuration (NA)

- Line protocol: North American
- Ring bridge period: 5.6 seconds
- Dial tone detect: Lines 1-16Yes
  Lines 17 -60No
- Meter pulse detectionDisabled

- Loop detection: Enabled
- Reverse polarity detection: Disabled
- DISA No
- Line flash typeCalibrated flash
  66 ms
- Line flash digits None
- Impedance coefficient setNormal (PBX line)
- Call line identityYes

Digital trunks

Table 12: Digital PRI-E1 link descriptor defaults

Field name	Setting
Number	3
Digital Link Descriptor Name	Default PRI E1
Termination Mode	NT
CRC-4 Enabled	Yes
Impedance	120 ohms

Table 13: Digital PRI-T1 link descriptor defaults

Field name	Setting
Number	3
Digital Link Descriptor Name	Default PRI T1
Termination Mode	NT
B8ZS Zero Code Suppression	Yes
Operation Mode	DSX-1
CSU Tx Line Build-Out	Not applicable

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Table 13: Digital PRI-T1 link descriptor defaults (continued)

Field name	Setting
DSX-1 Line Length	0-133 feet
Extended Super Frame	Yes
Inverted D Channel	No

(Page 2 of 2)

Table 14: Digital T1/D4 link descriptor defaults

Field name	Setting
Number	1
Digital Link Descriptor Name	Default T1/D4
Alarm Debounce Timer (ms)	500
Extended Super Frame	No
Line Coding	AMI&B8ZS
Operation Mode	DSX-1
CSU Tx Line Build-Out	Not applicable
DSX-1 Line Length	0-133 feet
Termination Mode	NT

Table 15: Digital E&M trunk circuit descriptor defaults

Field name	Setting
Number	8
Trunk Circuit Descriptor Name	Default E&M
Incoming and Outgoing Parameters	
Address Signaling	DTMF
Call Collision Handling	AT&T
AT&T Call Collision Handling	Backoff

(Page 1 of 2)

Table 15: Digital E&M trunk circuit descriptor defaults (continued)

Field name	Setting
Ignore Far End Disconnect	No
Release Acknowledge Timer (ms)	2500
Disconnect Timer (ms)	900
Incoming Parameters	
Incoming Start Type	Wink
ANI/DNIS	No
Minimum Flash Timer (ms)	250
Maximum Flash Timer (ms)	700
Outgoing Parameters	
Outgoing Start Type	Wink
Maximum Wink Timer (ms)	400
Minimum Wink Timer (ms)	100
Outpulse Delay Timer (ms)	800
Supervision Timer (ms)	200
Guard Timer	500
Flash Timer	300
Supervision Parameters	
Fake Answer Supervision After Outpulsing	No
Ignore Answer Supervision	No
Release Supervision Expected	Yes

Table 16: Digital CO trunk circuit descriptor defaults

Field name	Setting
Number	1
Trunk Circuit Descriptor Name	Default CO
Incoming and Outgoing Parameters	
Line Start Type	Ground Start
Guard Timer (ms)	100
Ignore Far End Disconnect	No
Disconnect Timer (ms)	2500
Incoming Parameters	
ANI/DNIS	No
Ringing Expected	Yes
Outgoing Parameters	
Address Signaling	DTMF
Seize Timer (ms)	10000
Flash Timer (ms)	300
Supervision Parameters	
Fake Answer Supervision After Outpulsing	No
Ignore Answer Supervision	No
Release Supervision Expected	Yes

Table 17: Digital DID trunk circuit descriptor defaults

Field name	Setting
Number	2
Trunk Circuit Descriptor Name	Default DID
Incoming and Outgoing Parameters	

(Page 1 of 2)

Table 17: Digital DID trunk circuit descriptor defaults (continued)

Field name	Setting
Address Signaling	DTMF
Call Collision Handling	AT&T
AT&T Call Collision Handling	Back-off
Ignore Far End Disconnect	No
Release Acknowledge Timer (ms)	2500
Disconnect Timer (ms)	900
Incoming Parameters	
Incoming Start Type	Wink
ANI/DNIS	No
Minimum Flash Timer (ms)	250
Maximum Flash Timer (ms)	700
Outgoing Parameters	
Outgoing Start Type	Wink
Maximum Wink Timer (ms)	400
Minimum Wink Time (ms)r	100
Outpulse Delay Timer (ms)	800
Supervision Timer (ms)	200
Guard Timer (ms)	500
Flash Timer (ms)	300
Supervision Parameters	
Fake Answer Supervision After Outpulsing	No
Ignore Answer Supervision	Yes
Release Supervision Expected	No

Restriction groups (extensions)

The extension restriction group determines the types of external calls that an extension can make. The higher the restriction group number, the lower the number of restrictions:

- the default is Class of Service (COS) 6, that is, no restrictions
- an extension set at COS 0 cannot make outgoing calls, except for Global Exceptions (for example, emergency numbers).
- The system can have five groups each with a maximum of twenty exception strings per COS.

Table 18: Restriction groups

Extension Class of Service Restriction Groups Extension COS	Restricted Restriction Groups	Allowed Group Exceptions
6	No Restriction	
5	5	5, 4, 3, 2, 1
4	5, 4	4, 3, 2, 1
3	5, 4, 3	3, 2, 1
2	5, 4, 3, 2	2, 1
1	5, 4, 3, 2, 1	1
0	Total Restriction except Global Exceptions	

Timers

The Timers form consists of three pages. You must press **Next** to see the next page of timers.

Table 19: Timer defaults

Timer	Default (seconds)	Min. (seconds)	Max (seconds)
Administrator	60	10	180
Abandon	60	10	600
Alarm Ring	60	10	255
Alarm Snooze	120	30	255
ALS70 DDI	4	1	20
Call Duration	10	1	60
Cyclic Ring	20	6	255
Delay Hotline	10	0	255
Digit Timeout	5	5	30
DISA Answer	2	0	10
Disconnect Delay	2	1	10
Door Answer	30	20	180
Dummy DT (Limit Wait for Dial Tone)	1	1	10
External Disconnect	120 minutes	10 minutes	240 minutes
ISDN Tone	1	0	30
Message Waiting	28 days	1 day	99 days
MF (DTMF) Blocking	5	1	30
No Answer	15	5	120
Revert (Recall)	60	10	255
Select (Ringer) Sound	10	10	30
Short Camp	23	5	180
Speech Connection	3	1	13
Store Abandon	10	1	255
System Abandon Timeout (Hold Recall)	60	10	600
Transfer COS	60	20	255
Voice Mail	2	1	10

Feature access codes

The digit 6 is assigned in the flexible number plan as the leading digit for feature access codes. To modify the leading digit, see *Review the numbering plan (p. 46)*.

Feature	Default
Account Codes	665
Alarm Calls	668
Alarm Call Cancel	669
Call Forward All to an Extension	611
Call Forward All to an Extension Group	618
Call Forward External Calls on No Answer or Busy to an Extension	632
Call Forward External Calls on No Answer or Busy to an Extension Group	639
Call Forward External Calls to an Extension	631
Call Forward External Calls to an Extension Group	638
Call Forward Internal Calls on No Answer or Busy to an Extension	622
Call Forward Internal Calls on No Answer or Busy to an Extension Group	627
Call Forward Internal Calls to an Extension	621
Call Forward Internal Calls to an Extension Group	629
Call Forward on No Answer or Busy to an Extension	620
Call Forward on No Answer or Busy to an Extension Group	619
Calling Line Identification Blocking	676
Call Park Pick-up	660
Cancel Forwarding	617
Cancel External Call Forward	630
Cancel Internal Call Forward	612
Cancel Follow Me (I'm Here)	640
Cancel Message Waiting	628

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Feature	Default
Display Contrast Control	652
Date Change	656
Direct Transfer To Voice Mail	648
Directed Call Pick-up	677
Directed Message Waiting	673
Do Not Disturb (DND)	607
Extension Paging	644
External Call Waiting	687
Follow Me	641
Follow Me (I'm Here)	642
Group Call Pick-Up	666
Hook Click (enable or disable on-hook confirmation click)	654
Identify Next Call	685
Key Click Control	653
ISDN Keypad Working	670
Last Call Cost	664
Last Call Duration Display	663
Last Number Redial	600
Lock/Unlock Superkey	680
Message Waiting	643
Night Service Pick-Up	696
PIN (Personal Identification Number) Codes	678
Recall on Lines	602
Remote Call Forward	688
Ringer Pitch Control	651
Time Change	655
Time and Date Change	684
Who Am I? Indication	675

Appendix B
Reference

Call logging (SMDR) details

Table 20: Call logging definitions

Heading	Definition
SEQ No. (Sequence Number)	Displays the record number for each log -- the Sequence Number resets to 0 when record 998 is reached.
CODE	Displays a four-character code, which identifies the logged event. Refer to Table 21 for a list of these events.
EXT NO (Extension Number)	The number of the extension, or the line in the case of a tandem-switched calls that originated the call. For tandem switching, the line number is preceded with: L for analog line.
ACC COD (Account Code)	The Account Code, if any, assigned to the call by the extension user. Account codes must be between three and twenty digits long and in the range 000-99999999999999999999; Users can input an account code to prevent the display of private outgoing calls in the Call Logging (SMDR) report. When account code "000" is used, the last four digits of the called telephone number are replaced by "xxxx" in the billing record; Refer to Account Codes (in the System Tool online help) for more information.
TIME	The time, in 24-hour format, that the record was printed.
RX FROM (Received From)	The extension that the call was transferred from.
TX TO (Transferred To)	The extension that the call was transferred to.

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Table 20: Call logging definitions (continued)

Heading	Definition
DURATION:	Displays the duration of the call. If the duration is less than 100 hours, the time is given in hours, minutes and seconds. If the duration is in excess of 100 hours, the time is given in hours and minutes. If the call is in excess of 10,000 hours or if the system clock was reset during the call, "RANGE " is displayed in the column.
LN NO (Line Number)	Displays the line number used during the call. The line number is preceded with 0 for an unallocated line; a space for an analog line.
DIALED DIGITS	Displays the digits dialed for a line or the target extension number for an internal call. If Account Code 000 is selected, the last four digits of the external number are replaced with "xxxx". Refer to Account Codes (in the System Tool online help) for more information.

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Table 21: Event Codes

Code	Event type
ABND	Incoming external call abandoned before being answered
ALRM	Alarm call set, cancelled, answered or unanswered
ANSW	Answered incoming external call
BARR	Barred outgoing external call
CCLK	The system's internal time was changed during the call
CDCL	Cyclic data call cleared
CSNA	Incoming call rings a cyclic group and is unanswered at one of the group's extensions. The number of the unanswered extension appears next to the code. For example: 423 CSNA 11:52:37 4452
DATE	The system's internal date was changed during the call
DDIN	Incoming DID call
DTIN	Data call initiated
DTTR	Data call terminated
EMER	Emergency call initiated
EXIC	Incoming external call
EXOG	Outgoing external call
HDIN	External call put on hold
HREC	External call recovered from hold
ICIN	Incoming external call ringing initiated
ININ	Internal call initiated
INTR	Internal call
NSER	Night Service 1 or 2 enabled or disabled
OGIN	Outgoing call initiated
RING	Extension or Extension Group is ringing
SELT	A selective logging message

(Page 1 of 2)

Table 21: Event Codes (continued)

Code	Event type
SERV	Service access
STOP	Extension user abandoned a call attempt
TDEM	Tandem switched call
XFIC	Identifies answer/cleardown of a transferred external call.
XFOG	Identifies the transfer of a trunk to another extension. If an extension accesses an outgoing trunk (by dialing the out access code) and then transfers the trunk to another extension and that extension competes the outgoing call an XFOG record is generated. For example: 233 EXOG 1000 16:21:46 1002 00:00:05 22 234 XFOG 1002 16:22:01 100000:00:15 7371111

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Ring Map handling

For systems installed in the UK

- LS/Class lines are non-DDI only
- BRI lines can be DDI or non-DDI.

Table 22: Standard ring map operation

Standard ringmap operation for DID (NA) and non-DDI only lines (UK)				
Entry 1	**Entry 2**	**Entry 3**	**Overflow**	**Call progression**
Ext	-	-	N/A	Rings the single extension and never goes to the attendant (backstop).
Stan	-	-	-	Rings all members of the Standard Group and never goes to the attendant (backstop).
Mov	-	-	-	1) Rings the first element of the group. 2) Cyclic ring timer causes the call to move to next member of group (until all members have been rung). 3) Cyclic Ring Timer expires when ringing last member and call rings ALL members of the group. 4) Cyclic Ring Timer expires when ringing ALL members so the call goes to the backstop until backstop timer expires.
Stan	-	-	Ext	Rings the All members of the Standard Group Cyclic Ring Timer Expires Call moves to the Overflow Extension Cyclic Ring Timer Expires Call Moves to backstop
Stan	-	-	Stan	Rings the All members of the Standard Group Cyclic Ring Timer Expires Call moves to ring All members of Overflow Standard Group Cyclic Ring Timer Expires Call Moves to backstop

(Page 1 of 5)

Table 22: Standard ring map operation (continued)

Standard ringmap operation for DID (NA) and non-DDI only lines (UK)				
Entry 1	**Entry 2**	**Entry 3**	**Overflow**	**Call progression**
Mov	-	-	Stan	Rings the first member of the Moving Group Cyclic Ring Timer Expires Call moves to next element in Group. This repeats till reaches the last element in Group. Cyclic Ring Timer Expires; Rings all elements in group. Cyclic Ring Timer Expires; Rings all members of Standard Overflow Group Cyclic Ring Timer Expires; Rings backstop.
Stan	-	-	Mov	Rings the All members of the Standard Group Cyclic Ring Timer Expires Call moves to ring first member of Overflow Group Cyclic Ring Timer Expires; Call moves to next element of Overflow Group. This repeats till the last element is reached. Cyclic ring Timer Expires; All elements of Overflow Group are rung. Cyclic Ring Timer Expires. Rings backstop.
Mov	-	-	Mov	Rings the First member of the Moving Group Cyclic Ring Timer Expires; Call moves to next element of Group. This repeats till the last element is reached. Cyclic Ring Timer Expires; All elements in Group are rung. Cyclic Ring Timer Expires; Call moves to first element of the Overflow Group. Cyclic Ring Timer Expires; Call moves to next element of Overflow Group. This repeats till the last element is reached. Cyclic ring Timer Expires; All elements of Overflow Group are rung. Cyclic Ring Timer Expires. Rings backstop.

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Table 22: Standard ring map operation (continued)

Standard ringmap operation for DID (NA) and non-DDI only lines (UK)				
Entry 1	**Entry 2**	**Entry 3**	**Overflow**	**Call progression**
Mov	-	-	Ext	Rings the First member of the Moving Group Cyclic Ring Timer Expires; Call moves to next element of Group. This repeats till the last element is reached. Cyclic Ring Timer Expires; All elements in Group are rung. Cyclic Ring Timer Expires; Call moves to Overflow Extension. Cyclic Ring Timer Expires Call moves to attendant (backstop).
Ext	Stan	-	N/A	Call Rings Single Extension and All members of the Standard Group. The Call will never go to the attendant (backstop).
Ext	Mov	-	N/A	Call rings the Extension plus the first element of the Group Cyclic Ring Timer Expires; Single Extension continues to ring plus the next element in the Group. This continues till the last element in the Group is rung. Cyclic Ring Timer Expires; Call Rings Single Extension and All members of the Group. Cyclic ring Timer Expires; Call moves to attendant (backstop).
Ext	Ext	-	N/A	Call Rings both Extensions and will never go to the attendant (backstop).
Ext	Stan	Ext	N/A	Call Rings both extensions and all elements in the Standard Group. Call will never go to the attendant (backstop).
Stan	Ext	Stan	N/A	Call Rings All elements in both groups and Extension. The call will never go to the attendant (backstop).
Stan	Stan	Stan	N/A	All elements in all three groups ring. Call will never go to the attendant (backstop).

Table 22: Standard ring map operation (continued)

Standard ringmap operation for DID (NA) and non-DDI only lines (UK)				
Entry 1	**Entry 2**	**Entry 3**	**Overflow**	**Call progression**
Ext	Ext	Ext	N/A	All Three Extensions will ring. Call will never go to the attendant (backstop).
Ext	Mov	Ext	N/A	Call rings both Extensions and the first element of the moving group. Cyclic Ring Timer Expires; Both extensions continue to Ring while next element of the moving group starts to ring. This continues until the last element of the group rings. Cyclic Ring Timer Expires; Both Extensions ring as well as all the elements of the group. Cyclic Ring Timer Expires; Call moves to attendant (backstop).
Mov	Ext	Mov	N/A	The first extension of both groups and the single extension ring. Cyclic Ring Timer Expires; Single Extension continues to ring and next element of Groups ring. This continues till last member of Groups ring. (NOTE IF groups are different size the smaller Group will wait at the ring all state until the larger group completes its cycle) Cyclic Ring Timer Expires; Single Extension and All elements of both Groups Ring. Cyclic Ring Timer Expires Call moves to (attendant) backstop.
Mov	Stan	Mov	N/A	The first element of both Moving Groups and All members of the Standard Group Ring. Cyclic Ring Timer Expires; Standard Group Continues to Ring. Moving Groups move to next element; This continues till the last element is rung Cyclic Ring Timers Expires; All elements of All Groups Ring. Cyclic Ring Timer Expires; Call moves to attendant (backstop).

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Table 22: Standard ring map operation (continued)

Standard ringmap operation for DID (NA) and non-DDI only lines (UK)				
Entry 1	**Entry 2**	**Entry 3**	**Overflow**	**Call progression**
Mov	Mov	Mov	N/A	First Element of all groups Ring. Moving Groups move to next element; This continues till the last element is rung. Cyclic Ring Timers Expires; All elements of All Groups Ring. Cyclic Ring Timer Expires; Call moves to attendant (backstop).
				(Page 5 of 5)

The Overflow Element of a Group will only be activated if it is the only element in the ring map, otherwise it will only ring the normal elements of the group. Moving Groups (MOV) refer to both Cyclic and Moving as the only difference in behavior is the selection of the start point.

Table 23: Cyclic ring map operation

Cyclic ring map operation for DID (NA) and non-DDI only lines (UK)				
Entry 1	**Entry 2**	**Entry 3**	**Overflow**	**Call progression**
Ext	-	-	N/A	Rings the single extension until the Cyclic ring Timer Expires when the call goes to attendant (backstop).
Stan	-	-	-	Rings all members of the Standard Group. When the Cyclic Ring Timer Expires the call goes to attendant (backstop).
Mov	-	-	-	As Described for Standard Ring Map
Stan	-	-	Ext	As Described for Standard Ring Map
Stan	-	-	Stan	As Described for Standard Ring Map
Mov	-	-	Stan	As Described for Standard Ring Map
Stan	-	-	Mov	As Described for Standard Ring Map
Mov	-	-	Mov	As Described for Standard Ring Map
Mov	-	-	Ext	As Described for Standard Ring Map
Ext	Stan	-	N/A	Call Rings Single Extension Cyclic ring Timer Expires : Call moves to ring All members of the Standard Group. Cyclic ring Timer Expires; Call moves to attendant (backstop).
Ext	Mov	-	N/A	Call rings the Single Extension Cyclic Ring Timer Expires; Call moves to first element of Moving Group Cyclic Ring Timer Expires; Call moves to Next element in the Group. This continues till the last element in the Group is rung. Cyclic Ring Timer Expires; Call Rings All members of the Group. Cyclic ring Timer Expires; Call moves to attendant (backstop).
(Page 1 of 5)				

Table 23: Cyclic ring map operation (continued)

Cyclic ring map operation for DID (NA) and non-DDI only lines (UK)				
Entry 1	**Entry 2**	**Entry 3**	**Overflow**	**Call progression**
Ext	Ext	-	N/A	Call Rings First Extension Cyclic Ring Timer Expires; Call moves to Second Extension Cyclic Ring Timer Expires; Call moves to attendant (backstop).
Ext	Stan	Ext	N/A	Call Rings First Extension Cyclic Ring Timer Expires; Call moves to Ring All members of Standard Group. Cyclic Ring Timer Expires; Call moves to Second Extension Cyclic Ring Timer Expires; Call moves to attendant (backstop).
Stan	Ext	Stan	N/A	Call Rings All elements in first group Cyclic Ring Timer Expires; Call moves to Single Extension Cyclic Ring Timer Expires; Call moves to ring All members of Second Group Cyclic Ring Timer Expires; Call moves to attendant (backstop).
Stan	Stan	Stan	N/A	Call Rings All elements of First Group Cyclic Ring Timer Expires; Call moves to All members of Second Group Cyclic Ring Timer Expires; Call moves to All members of Third Group Cyclic Ring Timer Expires; Call goes to attendant (backstop).
Ext	Ext	Ext	N/A	Call Rings First Extension Cyclic Ring Timer Expires; Call moves to Second Extension Cyclic Ring Timer Expires; Call moves to Third Extension Cyclic Ring Timer Expires; Call goes to attendant (backstop).

Table 23: Cyclic ring map operation (continued)

Cyclic ring map operation for DID (NA) and non-DDI only lines (UK)				
Entry 1	**Entry 2**	**Entry 3**	**Overflow**	**Call progression**
Ext	Mov	Ext	N/A	Call Rings first Extension Cyclic Ring Timer Expires; Call moves to First member of moving group. Cyclic Ring Timer Expires; Call moves to Next element in the moving group This repeats until the last element in the group is found. Cyclic Ring Timer Expires; Call rings All members of the Group Cyclic Ring Timer Expires; Call rings second extension Cyclic Ring Timer Expires; Call Rings attendant (backstop).
Mov	Ext	Mov	N/A	Call rings first element of first moving group Cyclic Ring Timer Expires; Call moves to Next element in the moving group This repeats until the last element in the group is found. Cyclic Ring Timer Expires; Call Rings All members of Group Cyclic Ring Timer Expires; Call moves to Extension Cyclic Ring Timer Expires; Call moves to first element of second moving group. Cyclic Ring Timer Expires; Call moves to Next element in the moving group This repeats until the last element in the group is found. Cyclic Ring Timer Expires; Call Rings All members of Group Cyclic Ring Timer Expires; Call Rings attendant (backstop).

(Page 3 of 5)

Table 23: Cyclic ring map operation (continued)

Cyclic ring map operation for DID (NA) and non-DDI only lines (UK)				
Entry 1	**Entry 2**	**Entry 3**	**Overflow**	**Call progression**
Mov	Stan	Mov	N/A	Call rings first element of first moving group Cyclic Ring Timer Expires; Call moves to Next element in the moving group This repeats until the last element in the group is found. Cyclic Ring Timer Expires; Call Rings All members of Group Cyclic Ring Timer Expires; Call rings All members of Standard Group Cyclic Ring Timer Expires; Call moves to first element of second moving group. Cyclic Ring Timer Expires; Call moves to Next element in the moving group This repeats until the last element in the group is found. Cyclic Ring Timer Expires; Call Rings All members of Group Cyclic Ring Timer Expires; Call Rings attendant (backstop).

Table 23: Cyclic ring map operation (continued)

Cyclic ring map operation for DID (NA) and non-DDI only lines (UK)				
Entry 1	**Entry 2**	**Entry 3**	**Overflow**	**Call progression**
Mov	Mov	Mov	N/A	Call rings first element of first moving group Cyclic Ring Timer Expires; Call moves to Next element in the moving group This repeats until the last element in the group is found. Cyclic Ring Timer Expires; Call Rings All members of Group Cyclic Ring Timer Expires; Call moves to first element of second moving group. Cyclic Ring Timer Expires; Call moves to Next element in the moving group This repeats until the last element in the group is found. Cyclic Ring Timer Expires; Call Rings All members of Second Group Cyclic Ring Timer Expires; Call moves to first element of Third moving group. Cyclic Ring Timer Expires; Call moves to Next element in the moving group This repeats until the last element in the group is found. Cyclic Ring Timer Expires; Call Rings All members of Group Cyclic Ring Timer Expires; Call Rings attendant (backstop).
(Page 5 of 5)				

Table 24: DID (NA) and DDI (UK) operation

Target	Overflow	Call progression
Ext	N/A	Call Presented to Extension; DDI Answer Timer expires Call goes to Extension Group 0.
Stan	None	Call Presented to All elements in Group. DDI Group Timer Expires Call goes to Extension Group 0.
Stan	Ext	Call Presented to All Elements in Group Cyclic Ring Timer Expires; Call moves to Overflow Extension Cyclic Ring Timer Expires; Call moves to Extension Group 0
Stan	Stan	Call presented to All Elements in Group Cyclic Ring Timer Expires; Call moves to All elements of Overflow Group Cyclic Ring Timer Expires; Call moves to Extension Group 0
Stan	Mov	Call presented to All elements in Group Cyclic Ring Timer Expires; Call moves to first element in Overflow Group Cyclic Ring Timer Expires; Call moves to next element in Group. This is repeated till the last element in the group is rung. Cyclic Ring Timer Expires; Call rings all elements in Group Cyclic Ring Timer Expires; Call moves to Extension Group 0
Mov	None	Call rings first element in Group Cyclic Ring Timer Expires; Call moves to next element in Group. This is repeated till the last element in the group is rung. Cyclic Ring Timer Expires; Call rings all elements in Group Cyclic Ring Timer Expires; Call moves to Extension Group 0
Mov	Ext	Call rings first element in Group Cyclic Ring Timer Expires; Call moves to next element in Group. This is repeated till the last element in the group is rung. Cyclic Ring Timer Expires; Call rings all elements in Group Cyclic Ring Timer Expires; Call moves to Overflow Extension Cyclic Ring Timer Expires; Call moves to Extension Group 0

Table 24: DID (NA) and DDI (UK) operation

Target	Overflow	Call progression
Mov	Stan	Call rings first element in Group Cyclic Ring Timer Expires; Call moves to next element in Group. This is repeated till the last element in the group is rung. Cyclic Ring Timer Expires; Call rings all elements in Group Cyclic Ring Timer Expires; Call moves to ring All elements of Overflow Group Cyclic Ring Timer Expires; Call moves to Extension Group 0
Mov	Mov	Call rings first element in Group Cyclic Ring Timer Expires; Call moves to next element in Group. This is repeated till the last element in the group is rung. Cyclic Ring Timer Expires; Call rings all elements in Group Cyclic Ring Timer Expires; Call moves to first element in Overflow Group Cyclic Ring Timer Expires; Call moves to next element in Group. This is repeated till the last element in the group is rung. Cyclic Ring Timer Expires; Call rings all elements in Group Cyclic Ring Timer Expires; Call moves to Extension Group 0

(Page 2 of 2)

For all the situations where Extension Group 0 is used the call should go to the attendant (backstop) if there is no Extension Group 0 defined.

Controller card connectors

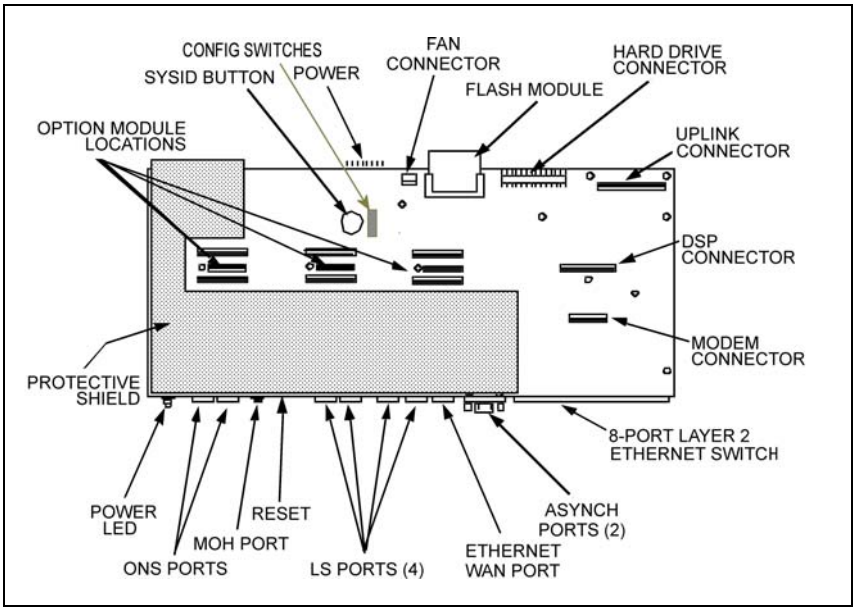


Figure 25: Controller card components and connectors

Port pinouts

Table 25: Serial port pinouts

Pin number	Signal name	Abbreviation
1	Data Carrier Detect	DCD
2	Receive Data	RXD
3	Transmit Data	TXD
4	Data Terminal Ready	DTR
5	Ground	GND
6	Data Set Ready	DSR
7	Request to Send	RTS
8	Clear to Send	CTS
9	Ring Indication	RI

The upper controller serial port supports call logging (SMDR); the lower serial port supports and diagnostics and maintenance functions. The ports default to

- 9600 bits/s
- 8 data bits
- no parity bit
- 1 stop bit.

Table 26: ONS ports

External signal	Interface position
Tip 1	Port 1, Pin 5
Ring 1	Port 1, Pin 4
Tip 2	Port 2, Pin 5
Ring 2	Port 2, Pin 4

Table 27: Ethernet ports

Signal	Pin number
Tx+	3
Tx-	6
Rx+	1
Rx-	2

Table 28: Ethernet WAN port

Signal	Pin number
Tx+	1
Tx-	2
Rx+	3
Rx-	6

Table 29: Quad LS/CLASS Line Interface (on controller card)

Signal	Pin number
Tip	3
Ring	4

Table 30: Analog services module

Port	Pin number	Signal
Port 1 LS/CLASS Port	1 -3	Not used
	4	Ring
	5	Tip
	6 - 8	Not used
Port 2 OPS Port	1 - 3	Not used
	4	Ring
	5	Tip
	6 - 8	Not used
Port 3 ONS or Door Relay Port	1 and 2	Isolated relay contacts (normally open) for controlling a door lock soleniod. These contacts close after the Door Open button on the Door Answer extension is pressed.
	3	Button contact
	4	Ring
	5	Tip
	6	Ground
	7 and 8	Isolated relay contacts (normally open) for controlling power to the door intercom. When the relay is closed, these pins provide power to the microphone and speaker of the door intercom unit. If a user presses the button on the door intercom unit, the intercom unit calls the Door Answer extension. After the Door Answer extension goes off-hook, these relays close and power is provided to the intercom's microphone and speaker.
Port 4 Loudspeaker Paging Port	1 and 2	Isolated relay contacts for controlling external equipment (normally open)
	3	Not used
	4 and 5	Bi-directional speech pair
	6	Not used
	7 and 8	Unassigned input - normally open circuit

Table 31: ONS module pinouts

Signal	Pin number
Ring	4
Tip	5

Table 32: LS/CLASS module

Pin number	Signal
1 to 3	No connection
4	Ring
5	Tip
6 to 8	No connection

The Tip and Ring pair carry speech signals at voltages between 0 and -120 V dc.

Table 33: T1 hybrid connector allocation

Signal	RJ-45 Connector Pin
RXRING	1
RXTIP	2
Not used	3
TXRING	4
TXTIP	5
Not used	6
Not Used	7
Not used	8

Use Category 5 cable to connect the T1/D4 interface between the T1/E1 port on the T1/E1 MMC and the central office or leased line. The pinout for these connectors is defined in Table 33 (page 229). The wires for the Rx and Tx connector pins should be from the same color-coded pair within the CAT 5 cable (for example: orange-white and white-orange).

Line protocols

Line protocols have the following behaviors:

Unguarded Clear: Similar to a standard home telephone where the person handling the call is expected to either

- hang up before the other party does, or
- hang up after hearing dial tone or reorder tone (after the other party hangs up).

Guarded Clear: Not supported on the current hardware.

CTR.21: Same as Guarded Clear, but allows for spurious line breaks on initial connection.

North American: Release if a break of at least 500 ms occurs in the line current.

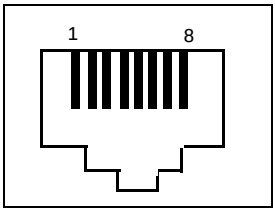
Disconnect Clear: Release if a line break of at least 455 ms occurs in the line current.

The main difference between the North American line protocol and the Disconnect Clear line protocol is the behavior when a line break occurs.

North American protocol does not break the loop and waits to see if the current returns. Disconnect Clear protocol waits 60 ms before breaking the outgoing loop to acknowledge the clear attempt. After a further 395 ms, it reconnects the loop to check if the current has returned. If not, it clears the loop.

Cable pinouts

RJ-45 to DB9 Adapter

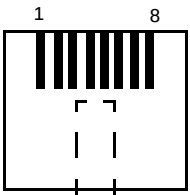


FRONT VIEW OF RJ45 PORT

NORMAL MALE OR FEMALE
RJ45 - DB9

1	BLUE
2	ORANGE
3	BLACK
4	RED
5	GREEN
6	YELLOW
7	BROWN
8	WHITE

Figure 26: RS-232 serial cable adapter



BOTTOM VIEW
OF CONNECTOR

NORMAL RJ45 CAT 5

1	WHT/GRN
2	GRN/WHT
3	WHT/OR
4	BLUE/WHT
5	WHT/BLUE
6	OR/WHT
7	WHT/BRN
8	BRN/WHT

CROSS OVER AT ONE
END OF CABLE

1	WHT/OR
2	OR/WHT
3	WHT/GRN
4	BLUE/WHT
5	WHT/BLUE
6	GRN/WHT
7	WHT/BRN
8	BRN/WHT

Figure 27: CAT 5 RJ45 patch cable

Appendix C
Planning

Introduction

Photocopy the tables in this chapter and complete them before you program the system.

Tables are provided for planning

- system login attributes
- voice parameters (extensions and lines)
- toll restriction
- voice mailbox programming
- network information
- emergency number plan.

System parameters

Digit	NA Function	UK Function
	Attendant	Operator
	Secondary: Extensions	Secondary: Extensions
	Secondary: Groups	Secondary: Groups
	Three-Party (Conference)	Three-Party (Conference)
	Speed Call (Short Code)	Speed Call (Short Code)
	Ring Back (when free)	Ring Back (when free)
	User (Feature) Code	User (Feature) Code
	Unpark	Unpark
	Call Pickup (extension group)	Call Pickup (extension group)
	Out Access (hunt lines)	Out Access (hunt lines)
	Supervisor	Not applicable

Voice parameters

Table 34: Login attributes

Username	System Tool	System Quick Installation Tool	Group Administration Tool	Desktop Tool	Extension number

Table 35: Extensions

Name (First, Last)	Extension Number	Hunt Map			COS	Personal directory allocation	PIN

Table 36: Extension groups

Extension Groups	Extension Group Members			
	Extension 1	Extension 2	Extension 3	Extension 4
200				
201				
202				
203				
204				
205				
206				
207				
208				

Table 37: Call Pickup groups

Extension	Extension numbers

Table 38: Ring Maps

Lines	Day Entry					
	Entry 1 Type	Entry 1	Entry 2 Type	Entry 2	Entry 3 Type	Entry 3
1						
2						
3						
4						
5						
6						
7						
8						
Lines	**Night Entry**					
	Entry 1 Type	**Entry 1**	**Entry 2 Type**	**Entry 2**		
1						
2						
3						
4						
5						
6						
7						
8						

Table 39: Night Service groups

Extension	Night Service Group 1 (Yes/No)	Night Service Group 2 (Yes/No)

Table 40: Line groups

Line Number	Line Group Number	Department (e.g. Sales)	Trunk Type	Line Access
1				
2				
3				
4				
5				
6				
7				
8				

Table 41: Hunt maps

Extension Number	Entry 1	Entry 2	Entry 3

Table 42: Digital PRI-E1 link descriptor

Field name	Setting	Setting	Setting
Number			
Digital Link Descriptor Name			
Termination Mode			
CRC-4 Enabled			
Impedance			

Table 43: Digital PRI-T1 link descriptor

Field name	Setting	Setting	Setting
Number			
Digital Link Descriptor Name			
Termination Mode			
B8ZS Zero Code Suppression			
Operation Mode			
CSU Tx Line Build-Out			
DSX-1 Line Length			
Extended Super Frame			
Inverted D Channel			

Table 44: Digital T1/D4 link descriptor

Field name	Setting	Setting	Setting
Number			
Digital Link Descriptor Name			
Alarm Debounce Timer			

Table 44: Digital T1/D4 link descriptor (continued)

Field name	Setting	Setting	Setting
Extended Super Frame			
Line Coding			
Operation Mode			
CSU Tx Line Build-Out			
DSX-1 Line Length			
Line Termination Mode			

Table 45: Digital E&M trunk circuit descriptor

Field name	Setting	Setting	Setting
Number			
Trunk Circuit Descriptor Name			
Incoming and Outgoing Parameters			
Address Signaling			
Call Collision Handling			
AT&T Call Collision Handling			
Ignore Far End Disconnect			
Release Acknowledge Timer (ms)			
Disconnect Timer (ms)			
Incoming Parameters			
Incoming Start Type			
ANI/DNIS			
Minimum Flash Timer (ms)			
Maximum Flash Timer (ms)			
Outgoing Parameters			

Table 45: Digital E&M trunk circuit descriptor (continued)

Field name	Setting	Setting	Setting
Outgoing Start Type			
Maximum Wink Timer (ms)			
Minimum Wink Timer (ms)			
Outpulse Delay Timer (ms)			
Supervision Timer (ms)			
Guard Timer			
Flash Timer			
Supervision Parameters			
Fake Answer Supervision After Outpulsing			
Ignore Answer Supervision			
Release Supervision Expected			

Table 46: Digital CO trunk circuit descriptor

Field name	Setting	Setting	Setting
Number			
Trunk Circuit Descriptor Name			
Incoming and Outgoing Parameters			
Line Start Type			
Guard Timer (ms)			
Ignore Far End Disconnect			
Disconnect Timer (ms)			
Incoming Parameters			
ANI/DNIS			
Ringing Expected			

Table 46: Digital CO trunk circuit descriptor (continued)

Field name	Setting	Setting	Setting
Outgoing Parameters			
Address Signaling			
Seize Timer (ms)			
Flash Timer (ms)			
Supervision Parameters			
Fake Answer Supervision After Outpulsing			
Ignore Answer Supervision			
Release Supervision Expected			

Table 47: Digital DID trunk circuit descriptor defaults

Field name	Setting	Setting	Setting
Number			
Trunk Circuit Descriptor Name			
Incoming and Outgoing Parameters			
Address Signaling			
Call Collision Handling			
AT&T Call Collision Handling			
Ignore Far End Disconnect			
Release Acknowledge Timer (ms)			
Disconnect Timer (ms)			
Incoming Parameters			
Incoming Start Type			
ANI/DNIS			
Minimum Flash Timer (ms)			

Table 47: Digital DID trunk circuit descriptor defaults (continued)

Field name	Setting	Setting	Setting
Maximum Flash Timer (ms)			
Outgoing Parameters			
Outgoing Start Type			
Maximum Wink Timer (ms)			
Minimum Wink Time (ms)			
Outpulse Delay Timer (ms)			
Supervision Timer (ms)			
Guard Timer (ms)			
Flash Timer (ms)			
Supervision Parameters			
Fake Answer Supervision After Outpulsing			
Ignore Answer Supervision			
Release Supervision Expected			

Table 48: Digital PRI trunk circuit descriptor defaults

Field name	Setting	Setting	Setting
Number			
Trunk Circuit Descriptor Name			

Table 49: Protocol Assignment

Field name	Setting	Setting	Setting
Number			
Digital Link Descriptor Name			
Termination Mode			
CRC-4 Enabled			
Impedance			

Table 50: Inward Dialing Configuration

Field name	Setting
Type of Line	
Calling Line Identification	
Number of National Digits	
Number of International Digits	
Number of Subscriber Digits	
Number of Unknown Digits	

Emergency numbers (ELINs)

Emergency number	
1	
2	
3	
4	
5	
6	

Index	System ELIN	Description
0		
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		

Toll restriction

Table 51: Restriction groups

Restriction	Grp Number	Restriciton Digits	Restricted Max Digit Count
1			
2			
3			
4			
5			
6			
7			
8			

Table 52: Restriction group exceptions

Restricted Group Number	Restricted Group Exceptions
1	
2	
3	
4	
5	

Table 53: Global strings

Global Restricted Strings (Prevent all users from dialling)	Global Exception (Allow all users to dial)

Voice mail

Table 54: Voice mailboxes

Mailbox Number	Name	Extension Number	Passcode	Operator Extension	Mailbox Type

IP networking

High speed internet access using static IP networking	
IP address	
Subnet mask	
Default gateway IP address	
Web server IP address	
High speed internet access using DHCP client	
Client name	
Web server IP address	
User name	
Password	
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Host name	
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